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If you should ask an older modeler to define a beginner, he would have more trouble than a sick-engined payload job because, in all probability, the nearest he ever came to a novice was the time he passed an open lot at 50 mph and caught a glimpse of a kid heaving a Jim Walker glider. There are some people who believe in service above self, as C. O. Wright calls it, who help kids to get started, show them how to have fun, and, in the process, make them into model builders. Some older modelers or "leaders", resting upon their aging empennages, sing loud and long about all the terrible things that are happening to the beginner. To unmask these characters, all you have to do is to propose anything that permits a kid to participate at their expense and the resulting rush of hot air would activate a supersonic wind tunnel.

With a yearly base of a million or two people of all ages who make a model, the contest system operates to filter out all but a few tens of thousands—and we use the word few optimistically—who are rugged and determined enough to hang on to compete in meets. Those fortunates who discover that models can be fun when flown for fun and escape into the anonymity of some hayfield or parking lot to do their flying, are the real backbone of the hobby or, if you will, the business. There isn't an engine manufacturer that doesn't wonder where so many of his engines disappear to.

The most serious thing wrong with the beginner question is our own attitude toward the beginner. We like to make him do the thing the hard way. Just because some of us older modelers go back to the twin pusher days, the days of hard wood and shellac, nails and blisters, should not mean that a beginner must shape his own edges, hack his own ribs, and so on. Americans ceased weaving their clothes by hand over a hundred years ago. Why must a beginner be versed in every type of model, every aspect of design and construction? You might just as well require him to hand-wind his own baseball from string and cover it with friction tape just because pa or grandpa did it. He'll get his share of handicraft as he progresses.

Out our way we have a guy who teaches everybody in sight how to fly his trainer type U-control model. That used to shock the writer, who believed that you were not a modeler unless you could adjust any and all bugs out of a free flight job. But there was one thing for sure: This guy was adding to the number of local people who were flying some kind of miniature aircraft with gas engines. If he was multiplied by a thousand other Sunday-afternoon flying leaders who did likewise, the hobby would grow to enormous proportions. The guys he taught to fly influenced other kids to fly. What we need are more small-town Jim Walkers!

After U-control invaded our family, expeditions to the local schoolyard had curious repercussions. Kids seemingly came out of the rocks, trickled in from everywhere, attracted by the sound of the engine or the momentary glimpse of a ship at the top of a wingover. Most of these boys had never seen a model airplane! A motor was an object of fascination. Where do you get these things? How much do they cost? What do you have to do? The notion that anybody could do it was an obvious novelty to them.

Apparently, there are hundreds of thousands of kids whose sole contact with model planes is a coincidental one, usually a dime-store solid or balsa glider. The connecting links have not been forged.

The contest picture, the very rules, could not be more discouraging to average modelers, to kids, to beginners, than if they had been scientifically designed for the purpose of keeping youngsters out of the experts' hair. In our book, an expert is anyone capable of flying in a modern contest. Relatively speaking, anyone who can do the stunt pattern is an expert. So is anyone who can handle and operate a real speed job, or a hot .29 free flight. Indoors is a prime example of how completely a sport can be evolved into a shrine for a few.

The creaky argument is that any of these events are for the expert, are meant to pay off for skill, to reward the years of apprenticeship, and the experts want it kept that way. This or that event is the pinnacle. Let the beginners fare for themselves, which is the polite way of telling them where to go. Letters to this column are sorrowful confirmation of this attitude of a hard- (*Continued on page* 5)

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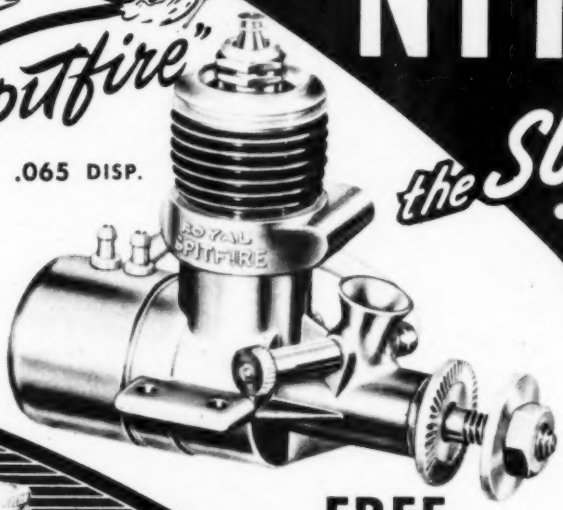

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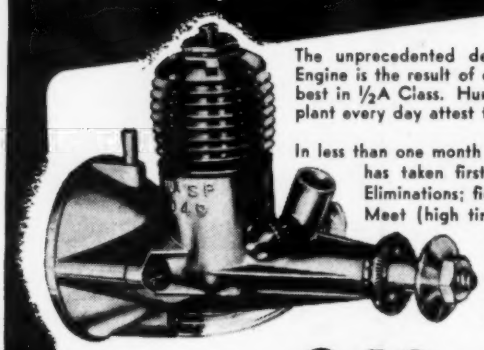

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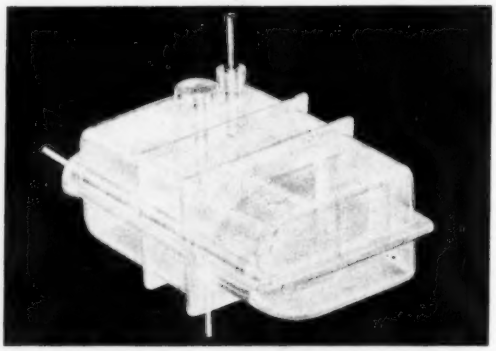

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REPORT FROM THE WEST

by Jim Saftig

The Phoenix Model Airplane Club staged its First Annual Southwestern Regional Model Airplane Contest, which proved to be one of the best that was ever held, according to witnesses and contestants alike. Free flight (rubber and gas) towline, and U-control (speed, stunt, and scale) were all combined in this very swell meet. The contest was held at the Phoenix Model Airport on March 4th, and was wonderfully run by C. D. Quentin Webster and his very able assistants. The Civil Air Patrol donated its time to help the modelers recover out-of-sight flights. One of the outstanding events of the meet was the Flying Scale entries. S. S. Estrada had his Atwood 51 powered *Navion* polished up, and it performed beautifully. Ray and Edith Downs' Orwick-powered Sammy Mason Stearman model captured second place, followed closely by John Brandt's Waco. This contest drew entries from Arizona, Texas, California, Nevada, New Mexico, and other neighboring states. The weatherman gave the flyers a break by allowing old man sunshine to poke his nose out for most of the day. The outstanding flight of the day was turned in by Don Sutton of Phoenix in the Open class. Don put his original Torp 24 powered free flight job up three times and each flight was over ten minutes. We would like to again give Quentin Webster and the Phoenix Model Club another 4.0 for the excellent contest they put on. Results: F.F., AA 1st, Ray and Edith Downs; A Class—1st, Dick Everett; B Class—1st, Don Sutton (30:00 minute perfect record); C Class—1st, W. E. Daniels. Rubber, Cabin, and Stick combined—1st, Dick Everett. Towline—1st, John Nogy. Flying Scale—1st, S. S. Estrada. Stunt (classes combined)—1st, Roy Robinson. Frank Townsend Jr. captured 1st in the Jr. Stunt Class. Speed B—1st, George Talbot. D Class—1st, Charles Schuette.

• • •

It seems that the contest season has gotten under way up north. A stiff wind and a muddy field didn't dampen the enthusiasm of the 103 entrants who participated in the Northern California Free Flight Council. As usual, the AA jobs outnumbered all other entries at least two to one. In the AA group, the *Wasp* powered *Zeeks* were very well represented and more than 20 of them were on tap. The Council is trying to figure out a way to keep the loss of ships down, especially in the AA group, and they are thinking of limiting them to a 15 sec. engine run with a three min. total flight limitation. Four flights will be allowed in place of the usual three, giving a total time of 12 min. for four perfect flights. As usual, the meet saw quite a few ships go "over the hill" due to the lack of dethermalizers. John Koons of the Sacramento Free Lancers took over the Contest Director duties and was ably assisted by Mario Bertolucci of the Sacramento Skyoneers. This first Council meet was held just behind Mather Field, Sacramento. We would like to add that these flyers up north have a club entry fee of $10.00 which allows all members of one club to participate for the one price. Non-Council flyers pay $1.50 for each gas entry and $1.00 for each rubber entry. Four classes of gas were on the agenda, and the rubber event allowed any size or type of rubber model.

A new club has been formed up north known as the Sonoma County Gas Model Association with a membership of 21. Club officers are as follows: President, John Taylor; Treasurer, Al Cope; Secretary, Howard Corbin. Anyone in the vicinity of Sonoma County who is interested in joining this newly formed club should contact the club secretary at 1220 Stewart St., Santa Rosa, California.

Results of the Northern California Free Flight Council Meet: AA—1st, Angelo Le-

(*Continued on page* 43)

SCRAP BOX

(*Continued from page 2*)

shelled small group of purists. If you extend this line of thinking, you are reminded of the America's Cup which used to be competed for by the wealthy owners of racing yachts. That boiled down to Vanderbilt and Sir Thomas Lipton, and when the tea king passed on, nothing was left. But any week-end in many localities, dozens, if not hundreds of small sailing boats, competed against each other. The approach that did the most for the sailing sport is obvious.

It isn't necessary to tear down the house and erect another. Contests are fun as they stand, and like any other active modeler, the writer hopes they go on forever. That he can go to them forever! For him there is nothing like the first smooth climb of a rubber job or a well adjusted free flight wheeling in a slow glide. A radio job on a 180 precision approach is the thrill supreme. Let's keep our complicated ships and rules, our hard-to-handle high powered stuff, but, at the same time, encourage the beginner by having some understanding of his interests, helping him to fly the things of his own choosing, and providing simple rules and events, at least at the club level, to get him into the swim. Pretty soon, he'll be as nutty as the rest of us.

The editorial seismograph has been picking up assorted tremors and a couple of quakes on the Scrap Box's remarks re the Wakefield. Editor Rushbrooke, of Britain's *Aeromodeller*, remarks about the hornet's nest that was stirred up but sagely lets it go at that. Editor Cosh, Britain's *Model Aircraft*, seems to have assumed that it's all because Americans are poor sports, and according to Andy Petersen, the California Thermal Thumbers found this highly upsetting. *Model Aircraft* this month carries a page of letters on the subject.

Because one of those letters points up certain aspects of the debate, aspects which require consideration, we are repeating verbatim comments by Britain's E. J. Buxton.

"Dear Sir,—The pounding you gave . . . in the "Here and There" column of the current (Feb.,) issue of *Model Aircraft* was unnecessarily severe, if not completely unjustified. For what . . . wrote indicated the thinking of model airplane enthusiasts, other than those who seem unable to bring themselves to believe that any other type of model aircraft could be as interesting and popular as a Wakefield—if they accept any other type of model that is.

"Pre-war, when rubber was king, and gliders and power models were as common as model aircraft built by aeromodelling's hierarchy, then there might have been some basis to consider the Wakefield model as the be-all and end-all of model airplanes. But it is now different. Gliders and power models have a following equal to and possibly exceeding that of the Wakefield.

"In America now the small 1/2A (0.82 c.c.) power job appears to be the most popular type of model. As more good 1/2 c.c. engines come on to the British market a similar situation might well occur here.

"I believe the Wakefield Cup was instituted to foster model aeronautics. Probably a very good way to achieve this aim is, without doubt, to have the Cup awarded to the most popular type of model aircraft since then maximum interest would be aroused. In the past this has been the case but if it can be shown that small-engined power models have a larger following than other types then it would not be at all unreasonable to suggest that to promote the donor's wishes the cup might be awarded for that class of model. Considered thus, . . . suggestion does not seem unjustified.

"Assuming that the Wakefield Cup remains for rubber model competition, then it would appear inevitable that it will lose or have to share some of the prestige you mention. The 'very high prestige' the Wakefield contest has held in the past is probably in large part accounted for by the fact that it was for rubber models which were the most popular type. Rubber, gliders and power now have about equal following so it is silly to suggest that International cups awarded for glider and power should not enjoy equal importance to the Wakefield Cup. (Agreed—Editor Cosh)

"The continued popularity of free-flight generally is due to the luck element (if you like to call it that) and not in spite of it. Just so long as the possibility of winning remains within the reach of the average person, free flight will be attractive. The trend towards the reduction of the element of luck in the Wakefield should be noted. Last year's contest being held overnight, and with this year's promised thuswise too, has had the effect of bringing a similar arrangement to this year's Final Trials with flights in the late evening and early morning. If by this means the element of luck is reduced, could it be that the following the Wakefield has at present will also be reduced? The competition is going to leave the average chap and wind up as a clambake for the experts where, in pursuit of still-air times, the models finish up with gears, return gears, pawls, dogs, clutches, variable pitch props, etc.

"H'm! Was . . . so much off the beam; or was . . . off the beam at all?"

One wonders if a companion gas event could be organized for the Wakefield. Suppose, for example, there was a gas division to the Wakefield, as well as rubber. One interesting possibility is that one basic design would suffice, perhaps having interchangeable noses. A small engined Wakefield happens to be very close to an AA payload model, which certainly holds further interesting possibilities. Companion airplanes would let the rubber only men be happy, while gas would further popularize and render more attractive the most famous international competition. It should be pointed out the name Wakefield does not necessarily mean rubber is the only motive power. At any rate, three members each for gas and rubber could be chosen for each Wakefield team or, given four elimination flights, any entry could make two with his rubber job and two more with his gas model. Perhaps total time of gas and rub-

(*Continued on page 45*)

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Waco 33" B-C	6.95
Warrior 36" A-B-C	4.95
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Wee Willie 18" AA-A	1.95
Whirlaway 11" AB	3.95
Wildfire 32" B-C-D	1.95
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Wing Dingus 18" AA	2.25
Yank 28" AA	1.50
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Aeronca Sedan 56" A-B-C	4.95
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All Amer Trainer 21" AA	1.75
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Baby Cinch 30" B-C	2.50
Baby Clown 32" AA	1.95
Baby Di-Doe 21" AA	1.75
Baby Era 18" AA-A	2.50
Baby Era Bipe 16" AA	2.50
Baby Era Bipe 30" A-B	2.95
Baby Barnstormer 28" AA	2.95
Barnstormer 47" A-B	5.95
Beechcraft 24" A-B	5.95
Ben Howards Pete 30" B-C-D	5.95
Berkeley Controliners:	
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Bearcat 36" C-D	4.95
Bee 24" B	1.50
Bug 17" A	1.95
Buster 24" B-C	2.95
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Lil Duper Zilch 42" A-B	3.95
Minnow 58" A-B-C	4.95
Mustang 57" A-B	5.95
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PeeWee Zilch 22" A-A-A	2.50
Super Duper Zilch 52" C-D	5.95
Thunderbolt 40" C-D	4.95
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Brave 38" A-B-C	4.75
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BURIED IN THIS AD are most of the new items. Sometimes there isn't time or space to include them. But, if available, we have it.

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FUELS (Continental U.S.A. Only)

	Pts	Qts
For Ignition		
Ohlsson #1, #3	.35	1.60
Power Mist #6	.65	—
For Glo		
Ohlsson #2, #4	.35	1.60
Ohlsson AA	.35	—
Powermist Glo	.35	—
Powermist Spitfire	—	1.60
Ranger Glo	.90	—
Testors 39	.75	—
Dynaglo	.55	—
Ranger AA	.90	—
Blue Blazer #1	.70	—

PROPELLERS

Rite Pitch Stunt 8, 9, 10, 11, 12, 13, 14 in., 6 and 8 pitch — .25
Rite Pitch 8, 9, 10, 11, 12, 13, 14 in., 5 & 8, pitch — .25
Scamper Plastic 5½" 3p., 6" 4p. .25; 7" 3p., 4p. 10" 3p., 11" 2 p., .60
Super Spl. 8", 9", 10" 11" in 5 & 8 p. — .15
Vero 6" 3p, 4p, 7" 4p, 5p, 8" 3p, 4p, 5p, 9" 4p, 7p, 10"—25¢; 7" 4 & 8"—30¢ 9"—35¢
Also Ohlsson, Flo-Torque, Power, etc.

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Universal Running Blocks — 1.00

METAL GAS TANKS

Dale Stunt Tanks—All Sizes — .65
#1—1½x1½x5½ #4—3½x11½x¾
#2—2½x11½x¾ #6—1½x11½x1
#3—2½x11½x1 #12—4½x8½x¾
#18—2½x11½x¾
Frams: 1½x1½ or 2 hor. or ver. .50
1½x11½x2 Sq. .80
1½x1½x2½ Wedge .80
1½x1x2½ ½-Rnd Stunt .80
Also Macco, Berkeley, Acme

IGNITION COILS

O.K. ..... 1.50 Rogers 2.00
O.K. Twin ..... 4.00 Wilco 1.98

CONDENSERS

Regular — .39 Smith Metal .35

SPARK & GLO PLUGS

Arden Glo (V2 or V3) — .95
Champion Glo V, V2, V3 — .75
Champion V, V2, V3, VR1, VR2 — .50
McCoy Hot Point — .95
Ohlsson Glo (V, V2 or AA) — .95
O.K. Glo-plug (V2 or V3) — .89
Plug washers — .05

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6 ft. Hook-up wire — .25
Arden Booster Jack — 1.25
Coastin Booster Coil — 4.95
Midget Switch; slide—.25 Turn — .50
Ohlsson Snap-Pack — .35

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1½"-.60c; 1½"-.90c; 2"-.95; 2½"-1.10
2" Needle Nose 1½" dia. — 1.15
2½" — 1.20
Plastic 1½" 2" — .75
Scamper Plastic 1½", 1¾", 2", 2½" — .45

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2½" — 1.25
Super Sonic Rubber, Doral hub (pr)
2"-.1" 30z 1½"; 1½" 35z 1⅝" — .45
1¼"—.60z, 2⅛" — .75
Tail Wheel — 1" — .15
Trexler Pneu. (pr) 1½" or 1½" — .40
1¾"-.2" 40z; 2½"-.60z 2¾" — .75
2½" — 1.00
3" — 1.25
3½" — 1.50

AA ACCESSORIES

Shut-off Valve (state engine) — .85
E-Z Minimount — 1.00
.004 or .006 x 2—.35 — .35
.006 x 3—.62 — .50
Flex Needle Valve (infant, spitfire torp Jr. & 049) — .50
Flex Needle Valve (Cubs) — 1.00
Spinners (state engine) — .60
Presto Starter (state engine) — .75
Prope (state engine) ..... .15 — .25
Tanks (state engine) ..... .85, .60, .75
Neoprene (ft) — .15
Fuel Meter — .50

MISCELLANEOUS

Batt. Box Pen. and Medium — .60
Brass Tubing 1/16", 3/32", 1/8" — .50
Copper Tubing ⅛" OD, per ft. — .30
Finger Guard — .40
Fuel Pump ½ pt., pt. — .60 qt. .75
Presto Disc Starter — .25
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Metal Pump Can — 1.75
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Neoprene Tubing, per foot — .10
Spitfire Timer Valve — 2.95
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The manufacturer of a well-known engine, after selling 30,000 at $9.95, has decided to go out of production. We have his remainder of 1,000 complete sets of finished castings and parts: Cylinder, piston, piston pin, connecting rod, needle valve, gas line, timer, crankshaft, crankcase, cam, etc., including screws, gaskets, nuts, etc.

You get a complete set, except spark plug and tank. An interesting souvenir of a model engine in the raw for your den or desk.

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- Chapter 5—Installation. • Chapter 6—Flying. • Chapter 7—Other Uses.
- Chapter 8—Operating Accessories. • Chapter 9—Trouble Shooting
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U-CONTROL ACCESSORIES

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.008, .012, .016: 3-150' — 1.00
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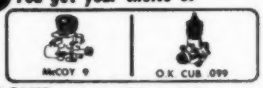

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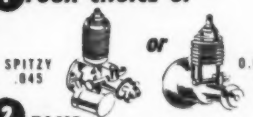

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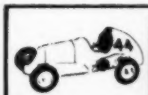

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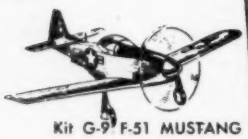

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★ **Monofoil Wings***

A Monogram revolutionary first. Wings have correct air foil, leading and trailing edges, spars and top planking built in. *Patent applied for.

★ **Prefabricated Fuselage**

All fuselage parts precision-cut. They snap into place for easy, speedy assembly. Puts in more fun—eliminates hard work.

★ **Amazing Realism**

Perfect engineering and design give every Speedee-Bilt Model that amazing, can't-be-copied realism. Plastic pilots for super realism included in some kits.

★ **Fun to Build and Fun to Fly**

Speedee-Bilt Models are so easy to build that construction is all fun. And when the model is finished (easy in one evening) it's even more fun to fly it.

★ **Pride-Satisfaction**

Every Speedee-Bilt Kit makes a good model—the kind that gives the builder pride and satisfaction in his handiwork. That's why so many build the entire Speedee-Bilt Series and continuously ask for more new models.

FUN TO BUILD

More of Everything for your Money in Speedee-Bilt Kits!

Speedee-Bilt Flying Models get the glad hand from model builders everywhere. They give gobs of fun and good times to thousands and thousands of fellows who say they are the Nation's top kits. Models are easy as pie to build in one fun-packed evening. Then for double enjoyment it's fun all over again when you fly them. Get Speedee-Bilt Models at your favorite store. Select them from the big display showing all models in colors and actual Speedee-Bilt parts. If no dealer in your neighborhood order from address below. Enclose 25c extra for shipment from nearby dealers stock.

12

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Monogram MODELS, INC.

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MODEL AIRPLANE NEWS JUNE 1951

Tulsa's Bob Dunham launches his 1951 Wakefield revision of his 1949 Nationals winner. Note how it has entered a rubber job's typical right climb.

rubber round-up

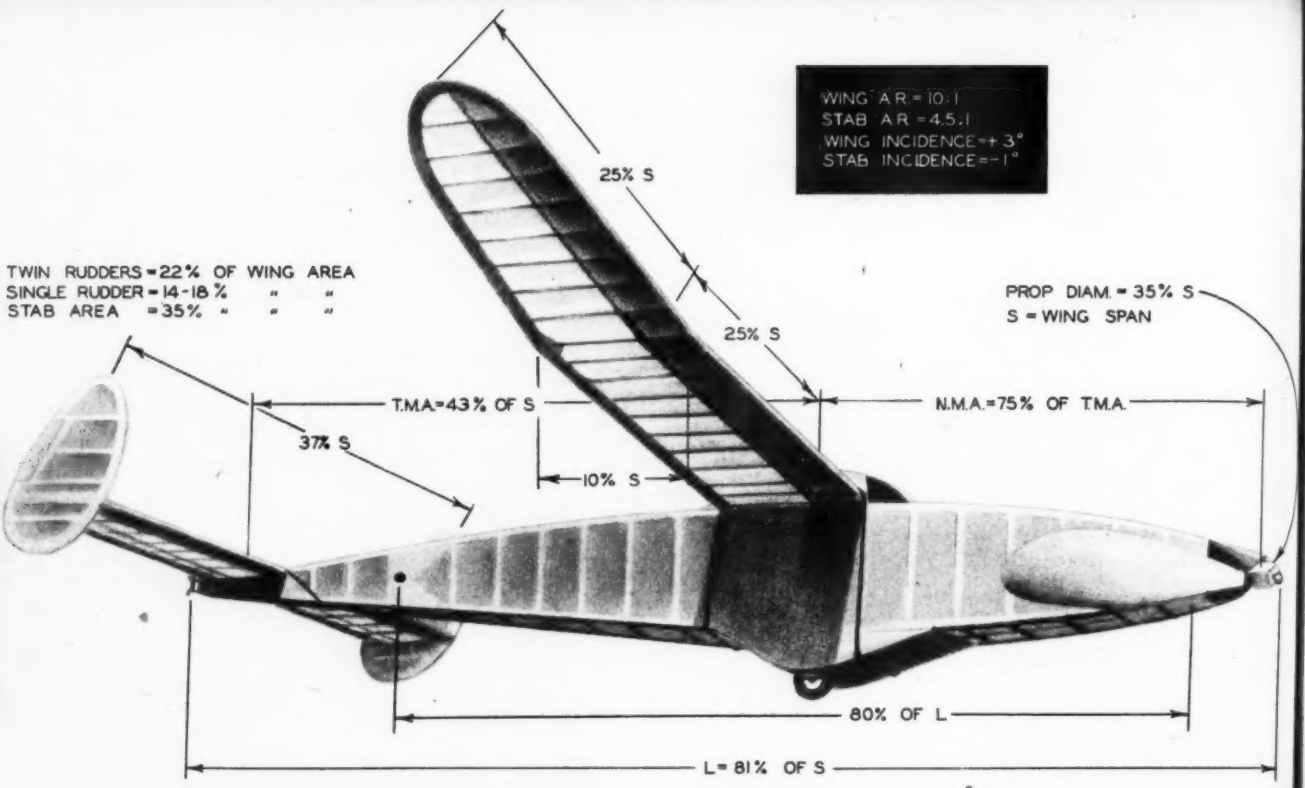
by CHARLES WOOD

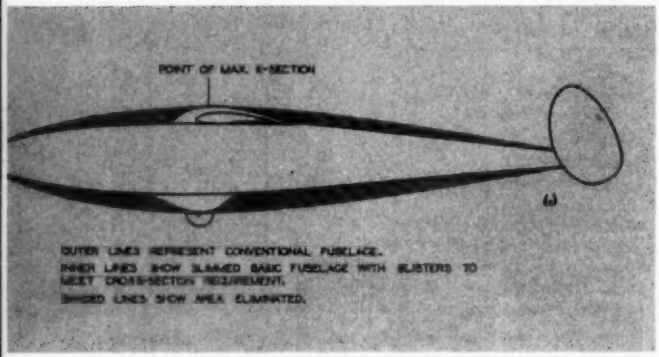
This article is intended for the model builder with some knowledge and practice in building models but who lacks the experience and knowledge necessary to design his own models. Perhaps the expert too will find in here a few helpful hints.

This article primarily deals with contest types of rubber models and as such it is concerned with one thing—consistent high performance. To attain this we must be prepared to sacrifice what is known as the pretty model. Contests are won on performance, not on good looks, as desirable as they may be. Any unnecessary structure (fairings, stringers, fillets, trimmings and decorations) that do not contribute to the performance of a model should be left off. They are merely extra weight and further complicate field repairs. The consistent contest model that is somewhat homely on the ground, but which comes through with the trophy or ribbon has a beauty all of its own. This does not mean however that a basically simple model has to be ungainly or ugly in appearance. It can, indeed, by proper layout be graceful and efficient at the same time. Careful workmanship and finishing of the model can make a great deal of difference in its final appearance.

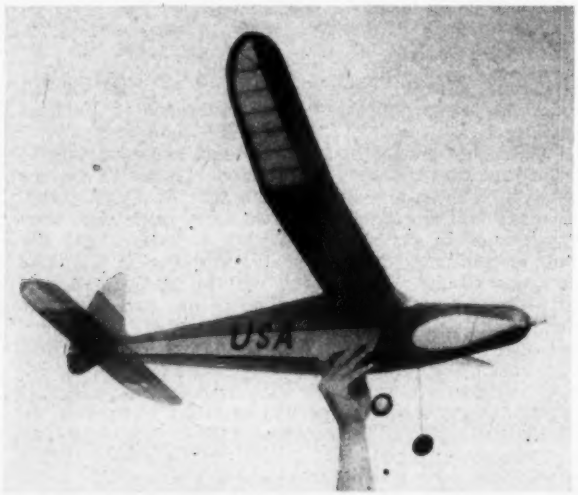
A point that should be kept in mind when starting to design your own rubber powered models is not to confuse the layout of a rubber model with that of a gas model. Too many embryo designers try to carry over what they have learned in gas powered models to rubber, and the result is confusion, frequent failures and generally discouraging results. The results will be much better if you forget what you have learned in gas and start out fresh. The basic reasons for this, of course, are the difference of weight distribution throughout the models and the difference in power and its application.

Generally in a contest type rubber model you will find that the c. g. (center of gravity) is about 1" forward of the center of the rubber motor. This is an important point to remember as it will be a helpful guide in laying out your fuselage, no matter what the length of the rubber motor is to be. Here then is a basic difference between




POINT OF MAX. X-SECTION
OUTER LINES REPRESENT CONVENTIONAL FUSELAGE.
INNER LINES SHOW SLIMMED BASIC FUSELAGE WITH BLISTERS TO MEET CROSS-SECTION REQUIREMENT.
SHADED LINES SHOW AREA ELIMINATED.

Drawing, top, is based on author's record holder. Above — Two schools of thought on fuselage profiles. Below — Author's successful Wakefield job.



THIS MASTERFUL ARTICLE ON THE PRACTICA

gas and rubber. In gas you have a concentrated weight in the form of an engine that can be placed in a very short nose and the weight of an engine will balance out the fuselage and the tail group. As a matter of fact, in many pylon types the engine sits under the leading edge of the wing and the model still balances correctly. In rubber, however, we have a motor that is nearly as long as the entire fuselage and in order to get the motor in the model we have to place about 55% of it behind the c. g. It is obvious that to achieve proper balance, the other 45% has to go in the nose or weight will have to be added to keep the c. g. in its correct position. Don't be afraid to design your model with a long nose moment arm! Nothing is more discouraging than to build a light model and then find that you have to pack an ounce or two of clay in the nose to balance it correctly because the nose moment arm is too short. You can safely use a nose moment (measuring from the center of the wing chord to prop bearing) up to 40 or 45% of the entire fuselage length and the model will be perfectly stable. Aarne Ellila is probably the top rubber man in the world today and his winning models feature a 42% nose moment arm. The trend towards long nose models has been very noticeable during the last two years and it reflects a change in our thinking. We are shooting for more consistent high-powered models that score high times on still-air days and less of the skyrocketing thermal-catchers that fall off badly on poor days. Yet it does not mean that we have sacrificed the ability to catch a thermal with these long nosed models. Rather we have increased their ability to sniff out a little riser when conditions are favorable due to the fact that the power run is increased and more altitude gained by using a long nose for more rubber length. To summarize then, the motor in a rubber model is distributed throughout the fuselage and a long nose moment arm is necessary to balance the model and increase the length of the motor run.

We come now to the most important difference between rubber and gas models, and this is power and its

High performance stick gets off at the last Nats. Strange to gas modelers is long climb with ship flying on its wing more than a propeller.

Noted Wakefield designer, Evans, Great Britain, who created the *Jaguar*, holds last year's second place machine with automatic pitch propeller.

ASPECTS OF DESIGN WILL BE A RUBBER MODELER'S BIBLE FOR A LONG TIME TO COME. FACT JAMMED.

application. When you understand this difference you will make allowances for the type of power that there is in a rubber motor and how it can most effectively be used. First of all, don't expect to get a twisting spiral "hanging on the prop" type of climb out of a rubber model because it just isn't there. Yet by using the rubber, prop, and wing effectively, you can get a rubber model just as high if not higher than a gas powered model. A gas engine, from the time you launch a model until the time the engine cuts out, puts out almost constant thrust and in many cases increases its thrust toward the end of the climb due to the engine leaning out. The model literally hangs on its prop and the engine "horses" it upstairs. This looks very spectacular and in many cases it really is, but it is also an optical illusion and gives the impression that the model is climbing at a terrific rate when actually it is climbing relatively slowly and the engine is doing all of the work. The wing is stalled out and merely acting as a resistant force to a spiral dive. In rubber power we have a force that is slowly and continually diminishing, varying from the time we launch the model until the prop blades fold or free-wheel. The power stored in a tightly wound rubber motor is terrific, but as soon as this power is released it very quickly reaches its peak and then tapers off gradually until it is unwound. Obviously, you can't expect to get a "hanging on the prop" type of climb when your power is continually decreasing. If you do, you'll get a type of climb that will start off beautifully but will end up with the "hang" and very little climb. It is true that rubber models have been built that will hang on the prop for most of the climb, but they are definitely tricky to handle and are rarely consistent winners, usually depending on a stally type of climb and glide that will bump into a thermal rather than seek it out.

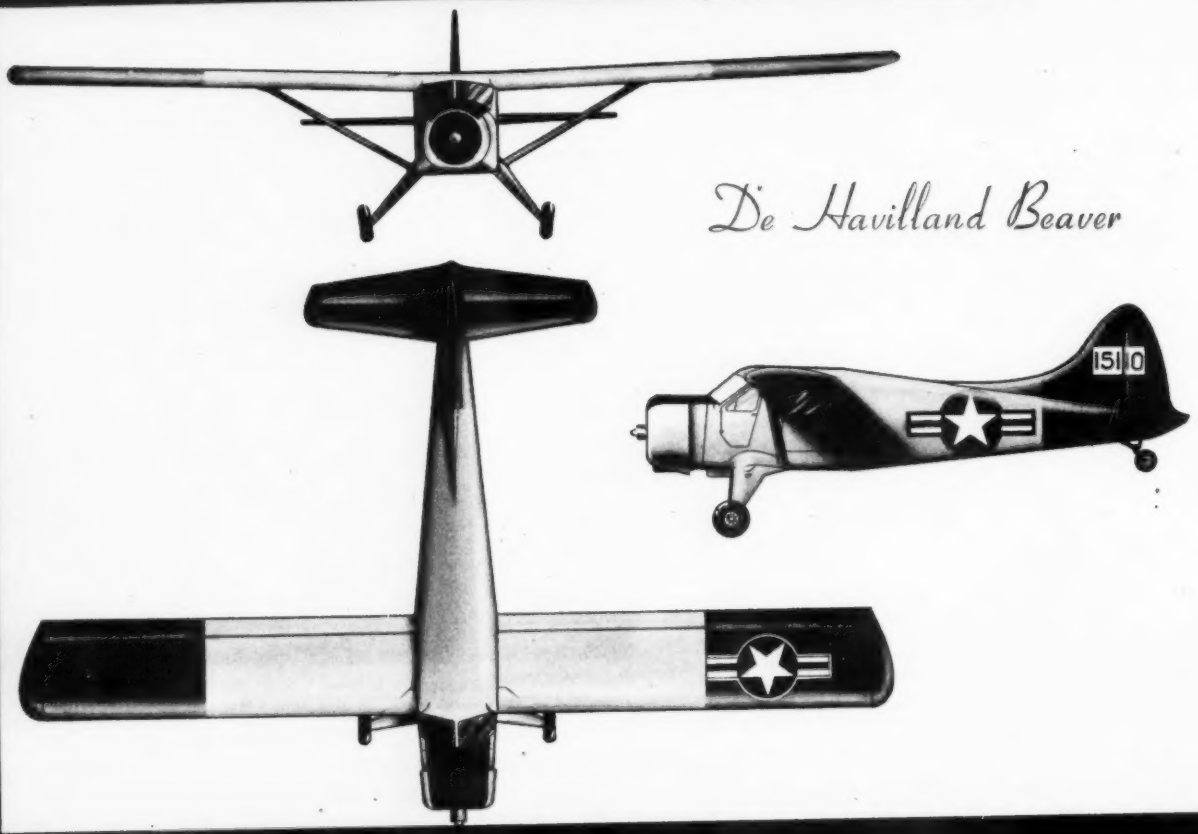
By settling for a shallower angle of climb you can take advantage of the long power run that a rubber motor offers, and after the first burst of power has been expended, the model will continue to climb steadily in large circles until the power is exhausted. This type of climb is easy to adjust for, and it will be consistent because it depends on the lift of the wing too, not on just the prop and rubber. The altitude gained is tremendous, and you can very nearly put the model out of sight on the power run alone.

Since performance is dependent on proper layout, construction and evaluation of the component parts that make up the entire model, let us examine these components such as the wing, tail, fuselage, and prop and rubber combination.

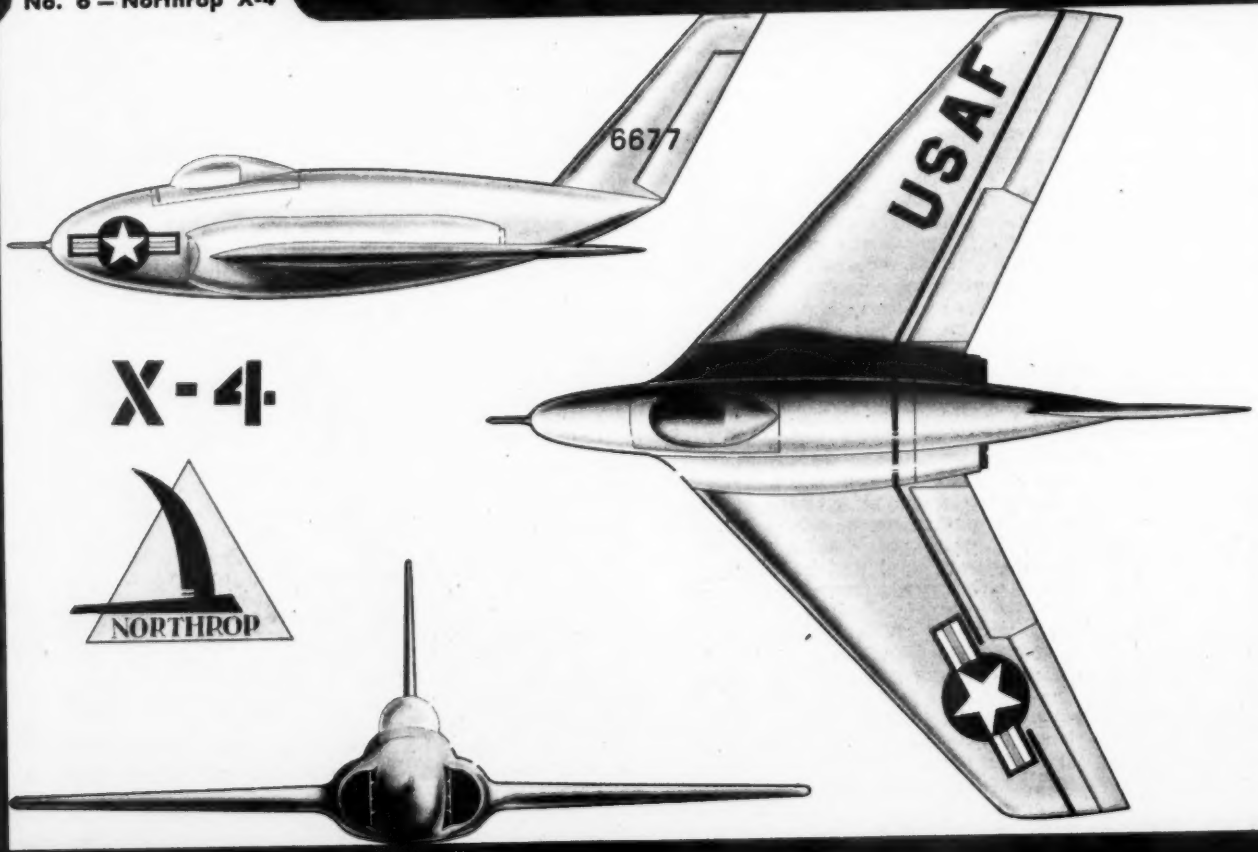
Since virtually all rubber model classes are determined by the wing area, let's take a look at the layout of a wing and see what makes it work. The first thing to consider is what airfoil to use. This is a problem and reams of technical material available to the designer who wishes to make a study of airfoils. Generally, we want an airfoil that has a good lift drag ratio. There are many excellent sections such as the Grant X series, NACA airfoils, Eiffel's, Clark Y's and RAF sections. Just what specific airfoil to use is largely up to the tastes of the designer. Actually, there is very little difference in the performance of these airfoils but they do have to be matched to the airplane. By this we mean that a thin airfoil should be used on a rather fast model and thick airfoil on the slower model. The author has used many airfoils, particularly on Wakefield designs and personally prefers the NACA 4612. This airfoil is excellent for nearly any type of large rubber design because of its resistance to stalling at high angles and because of its shallow undercamber that gives a beautiful glide but allows a fast climb without excessive drag. Actually it is a compromise between a fast and slow section and adapts itself beautifully to the particular flying gait of the model. My record-holding class D and E cabin models use this airfoil, and it more than proved its value.

Airfoils are a very complex subject when dealing with full scale aircraft that fly at relatively high speeds. But remember that in models (*Continued on page* 44)

No. 5 — DH Beaver

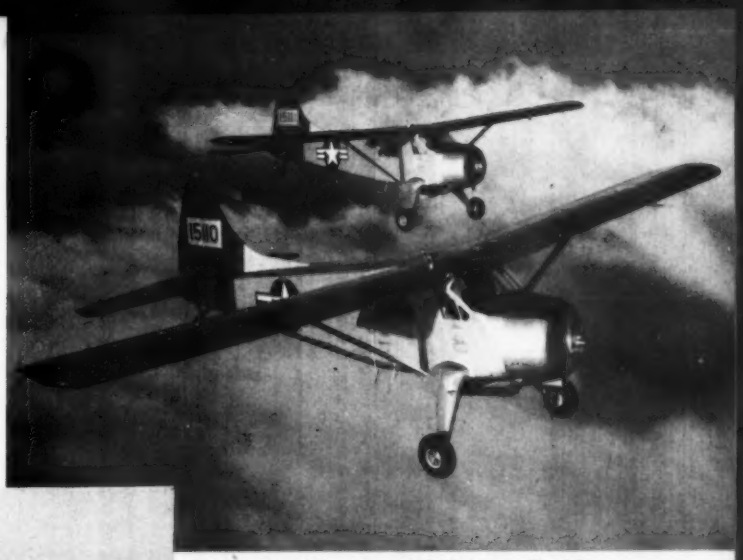


No. 6 — Northrop X-4



planes in the NEWS

by DAVID ANDERTON



Over 300 of the Canadian-built De Havilland *Beavers* will soon be delivered to the Army and Air Force.

Left — Detail hounds will find this side view valuable in making the model. Good for free flight, rc.

The story behind the ships that are making history. Add the three-views to your collection of the plane types that are worth modeling.

The Beaver, sturdy bush aircraft developed by De Havilland Aircraft of Canada Ltd., puts on military garb and joins up—with the United States. Over 300 of these rugged craft are slated to be flown across the border for delivery to our Army and Air Force during the coming months.

Born of the exceptional requirements of bush flying in Canada, the *Beaver* is a functionally beautiful airplane with performance to match. And bush flying requirements are tough, too. The planes operate all year round in blizzards and blistering heat, on floats, skis and wheels. They are seldom hangared; maintenance facilities are primitive. One day they haul people, the next freight. Design characteristics are few in number, but they are musts: ruggedness, dependability, superb performance. And the *Beaver* has those.

Small wonder then that the services settled on the *Beaver* for a utility aircraft. The AF (C-127) and the Army (L-20) versions will be basically the same airplane that De Havilland sells for $26,450 flyaway Toronto.

A P&W *Wasp Junior* powers the all-metal craft. Seating arrangement provides some comfort for the pilot, but the rest of these seats are of the quickly removable type. With seats out, there is a freight volume of 125 cu. ft. available, and 45 gal. oil drums can be rolled in through the side doors.

Because these planes will be expected to operate in and out of front-line areas, take-off and climb performance must be outstanding. Fully loaded and with zero wind, the *Beaver* gets off the ground in 550′ with flaps, and climbs at almost 1300 fpm. This is due to the use of a high-aspect ratio wing, large slotted flaps and ailerons, and aileron droop with full flap deflection. *Beaver* lands at about 50 mph, after an approach at about 75 mph. Wingspan is 48′; length, 30′ 3″; height, 10′ 7″. Gross weight is 4650 lbs.

We've chosen to show the first *C-127* for the Air Force in its Arctic markings of red wingtips and tail.

Northrop's X-4 is possibly the least-publicized research plane in the business. For more than two years this tiny white craft has been flying in the transonic range as a matter of routine, and probing and mapping that treacherous area of flight. But there are indications now that its long-term research program is drawing to a close. So this month we present a three-view of the *X-4* and a structural cutaway just released by the Air Force to give you an inside and outside treatment of this interesting plane.

In some ways the *X-4* is the direct opposite of (*Continued on page* 55)

Vought *F7U-3 Cutlass* is expected to look like 650 mph *F7U-1* shown here, but has thrust doubled.

AN IDEAL TRAINER AND SPORT MODEL THAT FLIES LIKE A CHARM

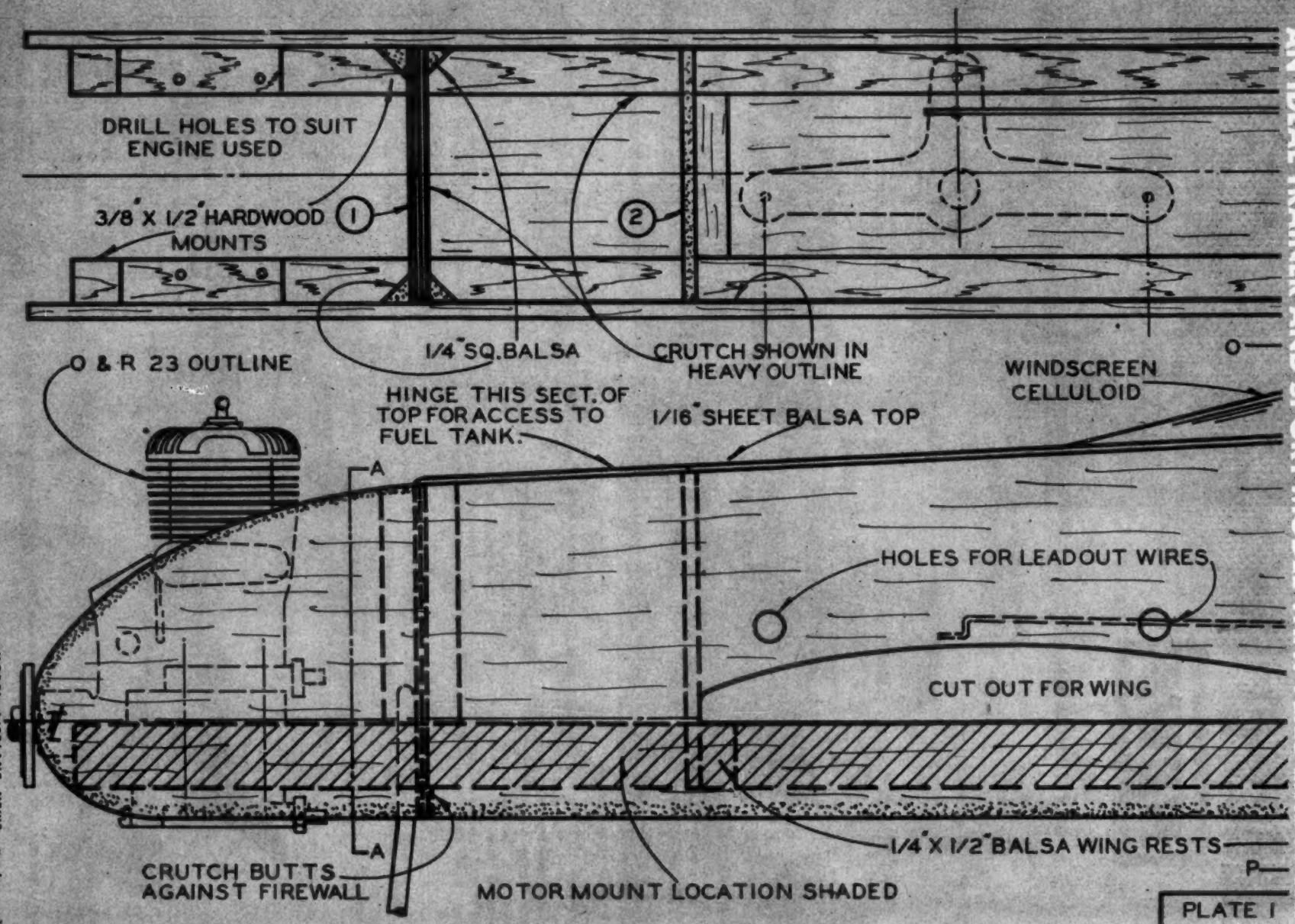
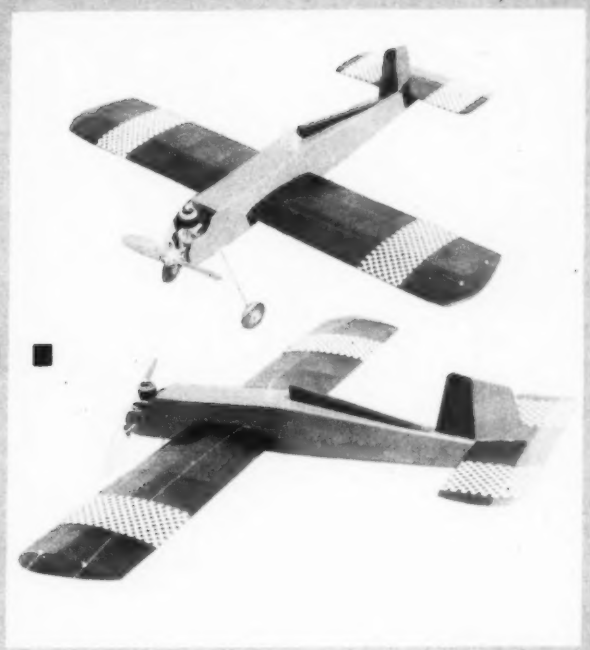


PLATE I

RM ULL-SIZE PLANS AND PREFABRI-

blunder bus

by HARRY WILLIAMSON



SPAN IS 32". POWER PLANT A .19 TO .29. SHEET BALSA CONSTRUCTION. COMPLETE FLYING INSTRUCTIONS ARE INCLUDED.

The *Blunder Bus* is a controline model that was designed with the novice in mind. Simplicity of construction, flyability and strength are the keynotes.

Our choice of .19 to .29 displacement engines for a beginner's model was governed by experience gained from several years' work with novices in controline flying. In the author's opinion, shared by many others incidentally, the novice has a much better chance of success in his initial attempt with a larger model.

A cardinal rule that should never be overlooked in model building is: Study and understand the drawings and instructions!

With this thought in mind and the materials at hand, let's start building.

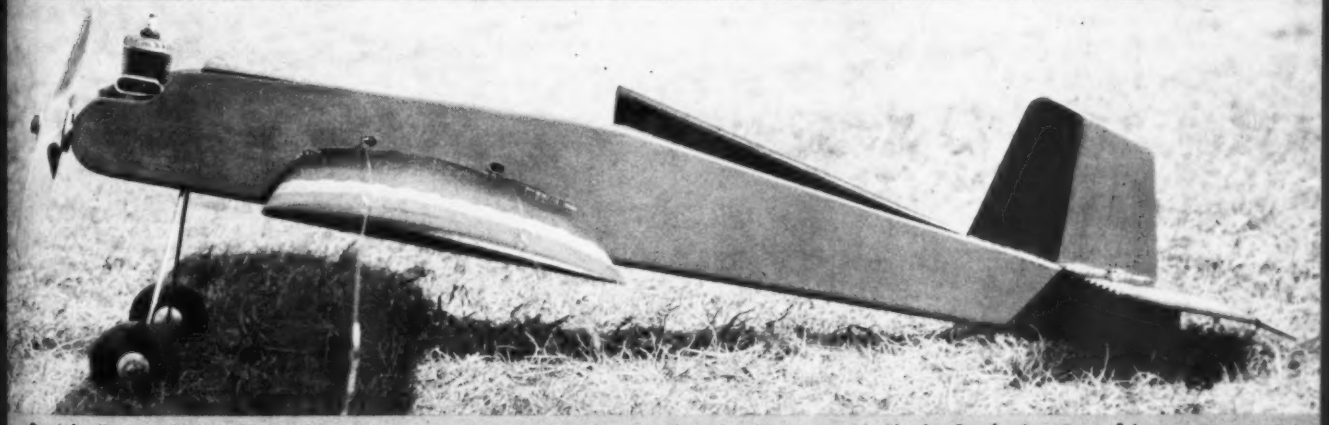
Wing. The construction of this part of the model is extremely simple, though a little unorthodox. Select two pieces of 3/16" x 3" x 36" medium hard sheet balsa. Cut 4" off one end of each sheet. This is your wing base with a span of 32". Lay them flat on the work bench and run a bead of glue along one edge of each sheet. These sheets should be straight and warp-free. Place the two sheets side by side with the glued edges together and hold flat with weights. The glue joint is shown in plates 4 and 5 with a heavy line running parallel with the wing. Now glue the leading edge of 1/8" x 1/4" balsa in place, flush with one edge of the sheet. Make an accurate cardboard template of the wing rib and cut 14 of them from 1/8" sheet balsa.

The rib locations are now accurately marked on the 3/16" sheet wing base, which has been drying all this time, and the ribs are glued in place against the leading edge. After the ribs are dry, select a piece of 1/4" square, hard balsa for your spar and glue in place. The spar should fit the notches snugly—not tight, not sloppy. A tight fit will create warps and a loose fit reduces the structural strength. When the spar joints have set, the hard wood bellcrank block should be fitted and cemented in place. After drying, drill the 1/8" hole for the bellcrank bolt—note that this hole is off center 1/8" to the left. Make the tips from miscellaneous balsa scraps. They should be roughly shaped and cemented to the end ribs.

When all the glue joints are firmly set, a sanding block is used vigorously to bevel the trailing edge and shape the leading edge and tips. Sand all high spots and the underside of the wing base. Check all glue joints and reglue all weak spots.

The entire wing structure, top and bottom is covered with *Silkspan*. Two coats of clear dope thinned down slightly, with 20 drops of castor oil added to 4 oz. of dope will complete the job.

Fuselage. The fuselage, like the wing, is a little out of the ordinary but again, is (*Continued on page 40*)



Straight lines combined with sheet-base wing construction, sheet fuselage crutch make ship a natural. *Blunder Bus* forgives many flying errors.

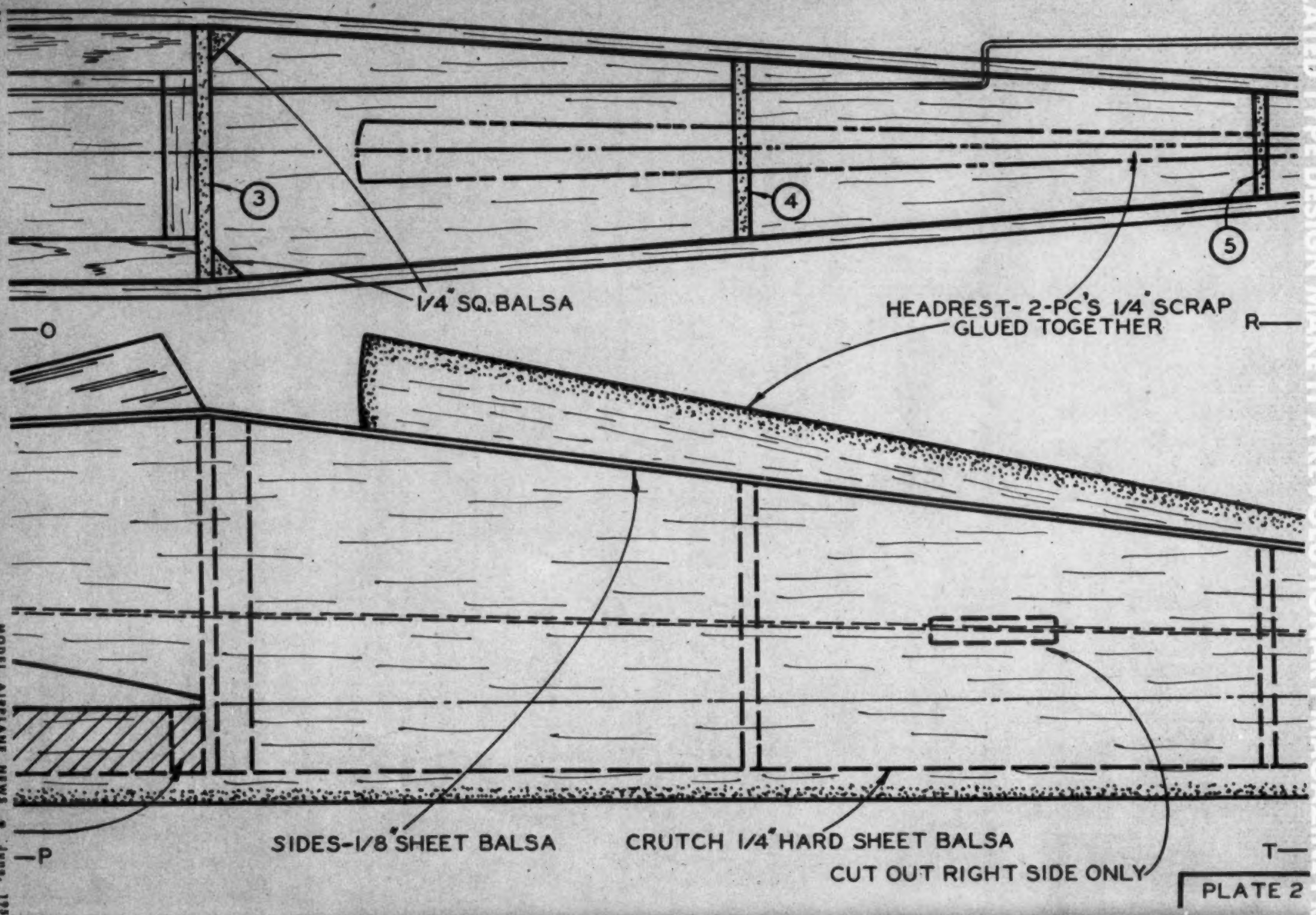
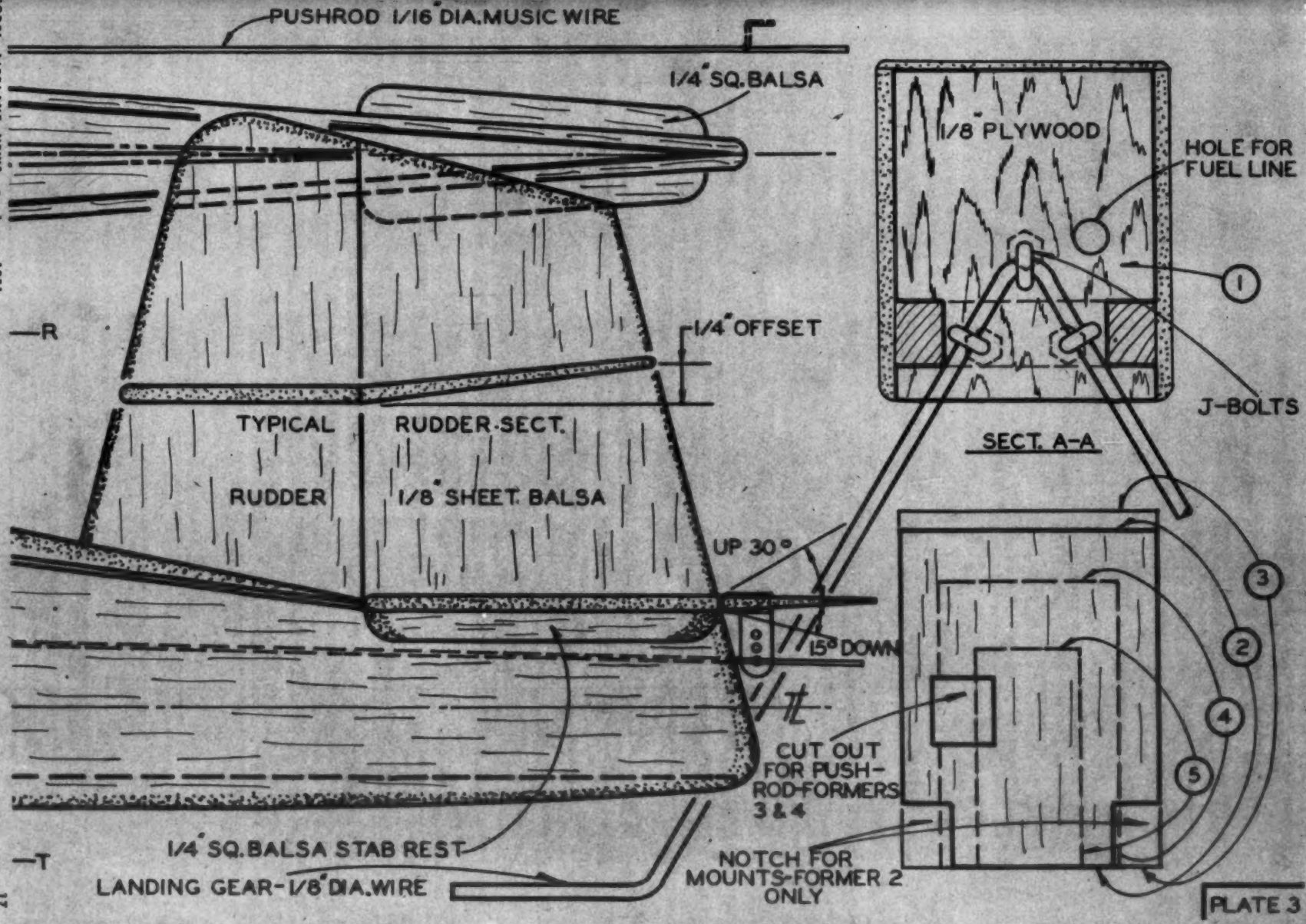


PLATE 2

CATED TYPE DESIGN MAKE IT A REVOLUTIONARY MAGAZINE PROJEC



ECT. IT WAS CREATED FOR YOUR FLYING PLEASURE ON THE SAGE

ADVICE OF A CLINIC OF EXPERTS. SIMPLICITY OF CONSTRUCTION STR

PLATE 4

STRENGTH, AND FLYABILITY, PRACTICAL DESIGN ARE KEYNOTES.

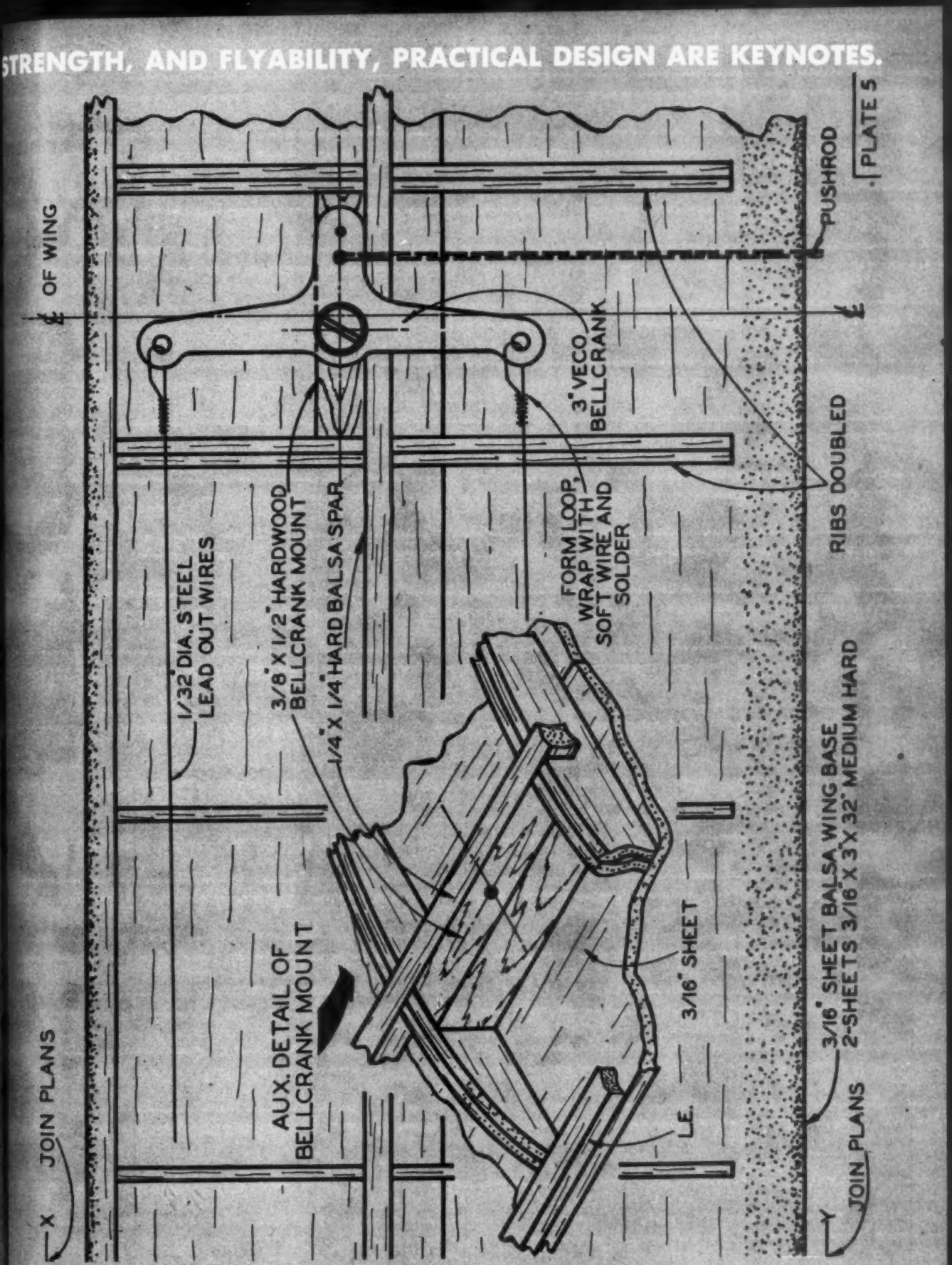
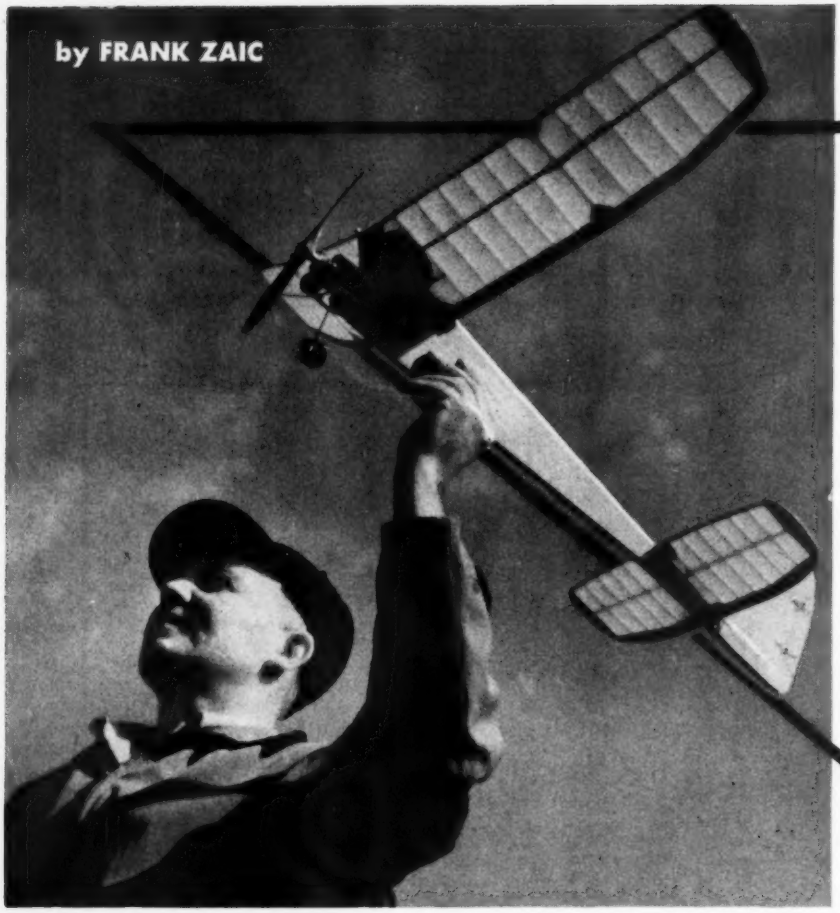


PLATE 5
PUSHROD
℄ OF WING
3" VECO BELLCRANK
FORM LOOP, WRAP WITH SOFT WIRE AND SOLDER
RIBS DOUBLED
1/32" DIA. STEEL LEAD OUT WIRES
3/8" X 1/2" HARDWOOD BELLCRANK MOUNT
1/4" X 1/4" HARD BALSA SPAR
AUX. DETAIL OF BELLCRANK MOUNT
3/16" SHEET
L.E.
3/16" SHEET BALSA WING BASE
2-SHEETS 3/16" X 3" X 32" MEDIUM HARD
X JOIN PLANS
JOIN PLANS Y

by FRANK ZAIC



angle on climb

Really steep climb without any turns—and without loops—resulted from these classic experiments

THERE it was, going straight up without a quiver. The motor howled. Seventeen seconds, 18, 19—what would happen when the motor cut? Would the ship stall, plummet down to lose a quarter of its altitude before going into the glide? There it's cut! The ship goes smoothly into a lazy meandering glide without the usual power dip. Not once but time after time the performance was repeated.

The model shown on the opposite page in plan form was the ship used in our climb experiments. Note that Cub .09 power on just 160 sq. in. wing, and that 8 oz. weight! And builders claim they can't handle 200 sq. in. of area with an .049. Our powerhouse is a result of a series of tests made to determine what makes high power models loop happy, or spiral dive crazy. It should not be assumed, however, that it is the final answer to all high-power problems. Consider it as a test model to determine the explanation of high-power frolics. If you want to build it for every-day flying, we suggest using lower power. The test model was tremendously overpowered on purpose.

Our original thought on the subject, which may be still shared by some of you, was that a low thrust line placed below the c.g. would tend to nose the model upward. Then, with surplus power, a loop should develop. This loop could be converted into a spiral climb, if a slight turn adjustment was made, or if the design of the model was such that it automatically developed a turn. Warps, side area distribution and such factors have been known to decide which way the model will turn under power.

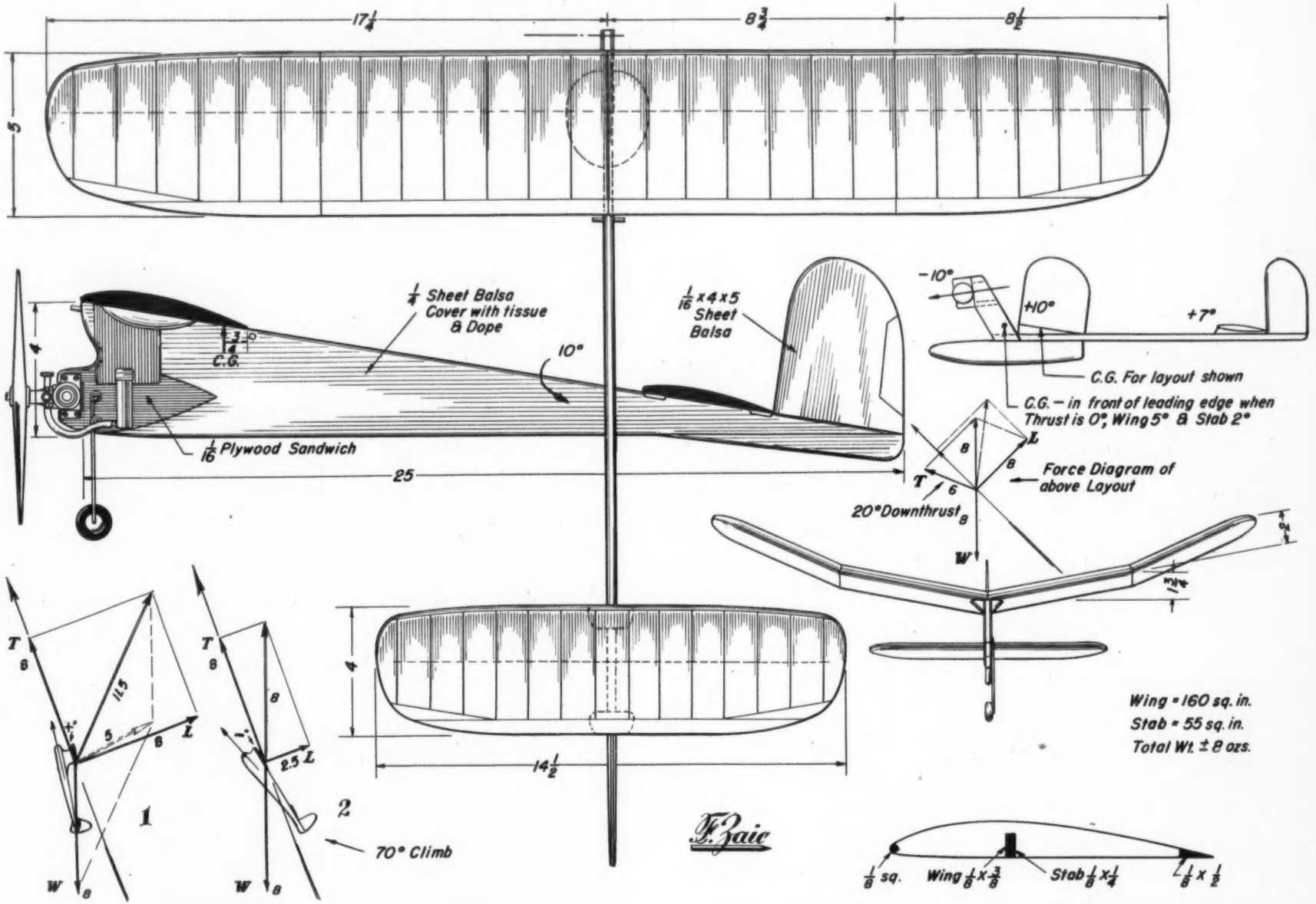
Thinking that a low thrust line could be the basic trouble, we made a model that had thrust line through the wing's center of lift and drag. (See sketch.) Much to our surprise, this ship made the prettiest loops you ever don't want to see. Usual reasoning would suggest a dive into the ground. The glide was perfect after the looping stopped, so tail-heavy trim could be ruled out as an explanation.

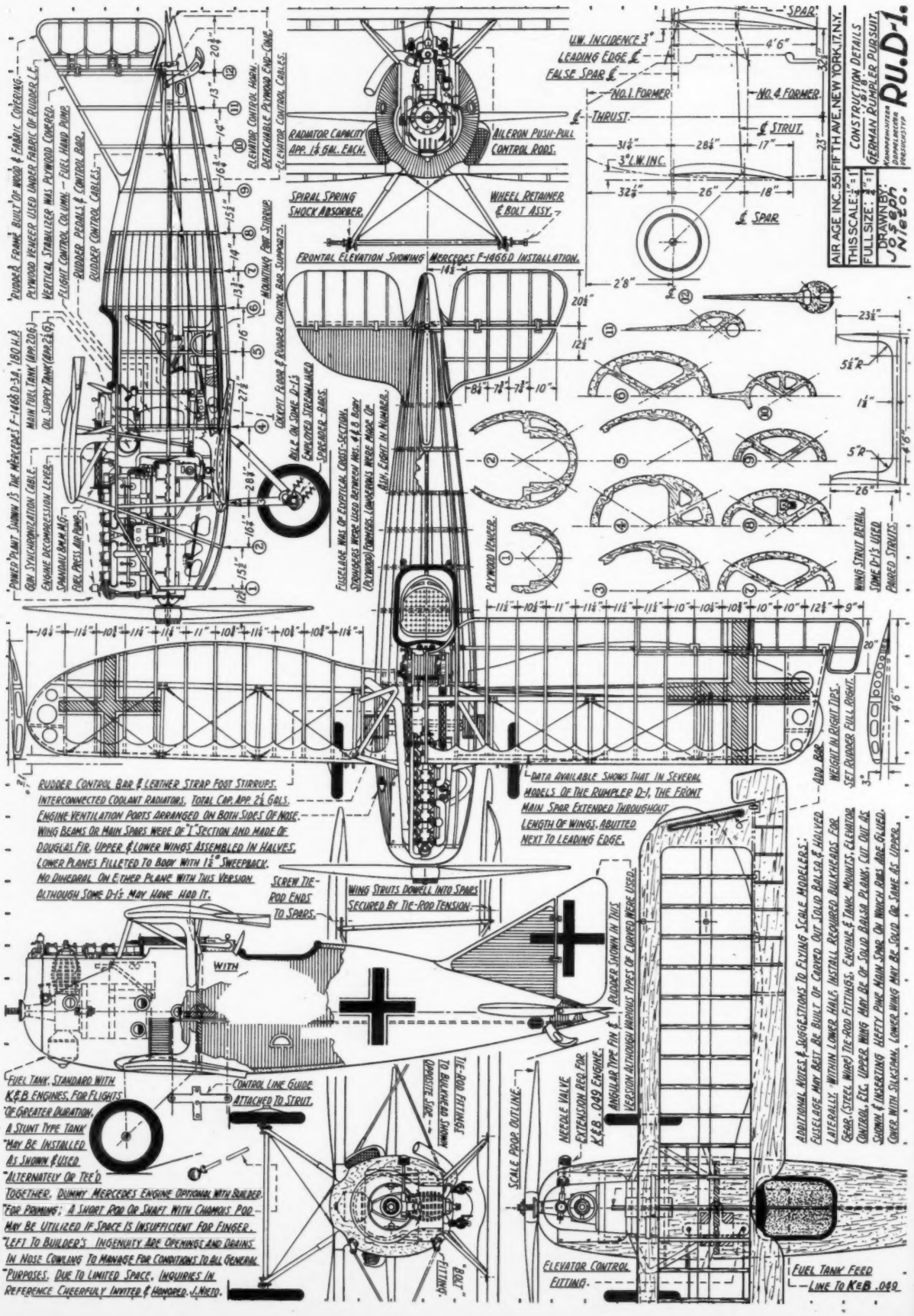
As another step further to prevent looping on the same design, the c.g. was shifted and a streamlined stabilizer was added. The idea was to make the stabilizer keep the model in a balanced condition no matter what sort of airflow would come along. (This was just about the worst thing we could have done, as later experiments proved.)

Finally, we were so determined to stop the high-thrust model from looping that weight was added steadily to the nose until the model made a sluggish 45° climb. (Weight of model 7 oz.; wing area 150 sq. in.; powered by Cub .045.) The c.g. position now was 1/2" in front of the leading edge. Glide? Never heard of such a thing!

So what would you have done? Getting a 45° climb with C.G. 1/2" in front of the leading edge was exactly what we had gotten. Followed much doodling with force diagrams until the assumption was inescapable that we did not know a thing about model aerodynamics.

It would take a book to explain the process by which we finally found the trouble. It seems that when we have high power, and its by-product, high speed, we should expect the model to generate much more lift than the weight of the model. To believe this, we must realize that models are trimmed by gliding them until we had a slow glide. This means that the model may be flying at about 6° angle of attack. Well, apply high (*Continued on page 49*)


17¼
8¾
8½
5
¼ Sheet Balsa Cover with tissue & Dope
C.G.
10°
1/16 x 4 x 5 Sheet Balsa
1/16 Plywood Sandwich
25
4
14½
-10°
+10°
+7°
C.G. For layout shown
C.G. – in front of leading edge when Thrust is 0°, Wing 5° & Stab 2°
Force Diagram of above Layout
20° Downthrust
T
L
W
8
6
1
2
115
5
2.5 L
70° Climb
Wing = 160 sq. in.
Stab = 55 sq. in.
Total Wt. ± 8 ozs.
1/8 sq.
Wing 1/8 x 3/8
Stab 1/8 x 1/4
1/8 x 1/2
F. Zaic


RU.D-1.
CONSTRUCTION DETAILS
GERMAN RUMPLER PURSUIT
AIR AGE INC. 551 FIFTH AVE. NEW YORK 17, N.Y.
THIS SCALE: 1/4" = 1"
FULL SIZE: 3/8" = 1"
DRAWN BY: JOSEPH NIETO.
RUDDER FRAME BUILT OF WOOD & FABRIC COVERING.
PLYWOOD VENEER USED UNDER FABRIC OF RUDDER I.E.
VERTICAL STABILIZER WAS PLYWOOD COVERED.
FLIGHT CONTROL COLUMN — FUEL HAND PUMP.
RUDDER PEDALS & CONTROL BAR.
RUDDER CONTROL CABLES.
ELEVATOR CONTROL HORN.
DETACHABLE PLYWOOD END-CONE.
ELEVATOR CONTROL CABLES.
MOUNTING PAD STRUTS.
MAIN FUEL TANK (APP. 2 1/2 GAL.)
OIL SUPPLY TANK (APP. 2 1/2 GAL.)
POWER PLANT SHOWN IS THE MERCEDES F-146 D-3A, 180 H.P.
GUN SYNCHRONIZATION CABLE.
ENGINE DECOMPRESSION LEVER.
STANDARD BMW M.G.
CARL PROELL AIR BOOST.
RADIATOR CAPACITY APP. 1 1/2 GAL. EACH.
AILERON PUSH-PULL CONTROL RODS.
SPIRAL SPRING SHOCK ABSORBER.
WHEEL RETAINER & BOLT ASSY.
FRONTAL ELEVATION SHOWING MERCEDES F-146 6.D INSTALLATION.
COCKPIT FLOOR & RUDDER CONTROL BAR SUPPORTS.
BILL OF SIDE D-13 ENCLOSED STREAMLINED SPRUNG-BASS.
FUSELAGE MDL. OF EVEN CIRCULAR CROSS-SECTION. STRINGERS WERE USED BETWEEN MDL. 4 & 8 BODY (PLYWOOD FORMERS). LONGERONS WERE MADE OF ASH, EIGHT IN NUMBER.
PLYWOOD VENEER.
U/W. INCIDENCE 3°
LEADING EDGE ℄
FALSE SPAR ℄
SPAR
4'6"
NO. 1 FORMER
NO. 4 FORMER
℄ THRUST
℄ STRUT
3 1/4°
3° L.W. INC.
℄ SPAR
WING STRUT DETAIL. SOME D-1's USED PAIRED STRUTS.
SET RUDDER FULL RIGHT.
WEIGHT IN RIGHT TIPS.
ADD BAR
RUDDER CONTROL BAR & LEATHER STRAP FOOT STIRRUPS.
INTERCONNECTED COOLANT RADIATORS. TOTAL CAP. APP. 2 1/2 GALS.
ENGINE VENTILATION PORTS ARRANGED ON BOTH SIDES OF NOSE.
WING BEAMS OR MAIN SPARS WERE OF "I" SECTION AND MADE OF DOUGLAS FIR. UPPER & LOWER WINGS ASSEMBLED IN HALVES.
LOWER PLANES FILLETED TO BODY WITH 1 1/2" SWEEPBACK.
NO DIHEDRAL ON EITHER PLANE WITH THIS VERSION. ALTHOUGH SOME D-1's MAY HAVE HAD IT.
DATA AVAILABLE SHOWS THAT IN SEVERAL MODELS OF THE RUMPLER D-1, THE FRONT MAIN SPAR EXTENDED THROUGHOUT LENGTH OF WINGS, ABUTTED NEXT TO LEADING EDGE.
SCREW TIE-ROD ENDS TO SPARS.
WING STRUTS DOWELL INTO SPARS SECURED BY TIE-ROD TENSION.
RUDDER SHOWN IN THIS VERSION ALTHOUGH VARIOUS TYPES OF CURVED WERE USED.
ANGULAR TYPE FIN ℄
ADDITIONAL NOTES & SUGGESTIONS TO FLYING SCALE MODELERS: FUSELAGE MAY BEST BE BUILT OF CARVED OUT SOLID BALSA & HALVED LATERALLY. WITHIN LOWER HALF, INSTALL REQUIRED BULKHEADS FOR GEAR (STEEL WIRE) TIE-ROD FITTINGS, ENGINE & TANK MOUNTS, ELEVATOR CONTROL, ETC. UPPER WING MAY BE OF SOLID BALSA PLANK, CUT OUT AS SHOWN & INSERTING LIGHT PINE MAIN SPAR ON WHICH RIBS ARE GLUED. COVER WITH SILKSPAN. LOWER WING MAY BE SOLID OR SAME AS UPPER.
WITH
FUEL TANK STANDARD WITH K&B ENGINES. FOR FLIGHTS OF GREATER DURATION, A STUNT TYPE TANK MAY BE INSTALLED AS SHOWN & USED ALTERNATELY OR TEE'D TOGETHER. DUMMY MERCEDES ENGINE OPTIONAL WITH BUILDER. FOR PRIMING: A SWORT POD OR SWAFT WITH CHAMOIS POD MAY BE UTILIZED IF SPACE IS INSUFFICIENT FOR FINGER. LEFT TO BUILDER'S INGENUITY ARE OPENINGS AND DRAINS IN NOSE COWLING TO MANAGE FOR CONDITIONS TO ALL GENERAL PURPOSES. DUE TO LIMITED SPACE, INQUIRIES IN REFERENCE CHEERFULLY INVITED & HONORED. J. NIETO.
CONTROL LINE GUIDE ATTACHED TO STRUT.
TIE-ROD FITTINGS TO BULKHEAD SHOWN
SCALE PROP OUTLINE
NEEDLE VALVE EXTENSION REQ. FOR K&B .049 ENGINE.
ELEVATOR CONTROL FITTING.
FUEL TANK FEED LINE TO K&B .049

Rumpler D-1

PART TWO

One of the fastest of German machines, the *D-1* excelled in straight away climb and reached a ceiling of 26,000 ft. Maneuverability tops — to 13,000 ft.

by ROBERT HARE

The strange tale of the German super-fighter of WW I — and the still stranger tale of why it failed to click.

The winter of 1917-18 saw the culmination of tests on the Rumpler 7D-series of research airplanes and the eventual development of model *8D-1*. This was to be Rumpler's big push into the single seat fighter field which it had never before entered. No manufacturer had ever, up to that time, spent so much effort to develop a type foreign to its specialty. Naturally, great things were expected of it, both by the manufacturer and by German officialdom.

What actually happened was, perhaps, one of the sad tales of aviation in World War I, depending on how sentimental you are about it. This final ship, the Rumpler *8D-1*, officially designated as the Ru. D.I, never did reach the front in service quantities, and was actually nosed out by ships which were inferior in specific points of performance, but which were chosen for their better all-around characteristics.

The nosing out process occurred in an official competition held early in 1918, and which was won by the Fokker *D.VII*. The latest pursuit types of almost all the major manufacturers of German aircraft were represented in this contest for contracts. From official figures and records, here is the way the Ru. *D.I.* performed:

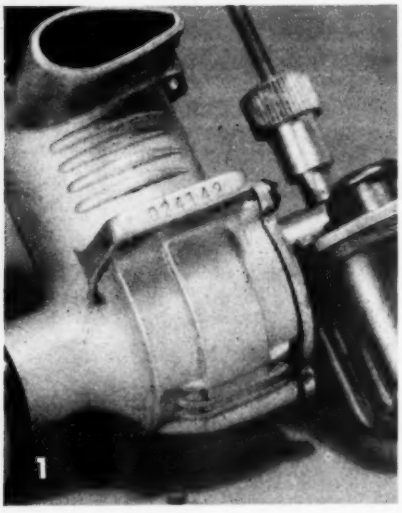
At sea level, the Ru. *D.I.* was rated at 124.2 mph and was described on official records as "one of the fastest, if not the fastest, of German airplanes." At 5,000 m., the speed dropped off to nearly 112 mph, which still was a pretty good clip for that altitude. Fully loaded, the Ru. *D.I.* could climb to 5,000 m. in 13.2 min.; to 6,000 m. in 17.8 min,; 7,000 m. in 26.2 min., and to 8,000 m. in 53.3 min. The latter altitude is (*Continued on page* 47)

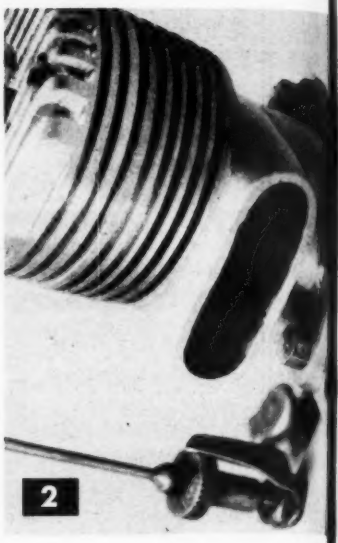
Interesting outlines, clean design, simplicity combine to make the *D-1* an excellent subject for the control scale addicts. Real ship was very complicated.

know your engines?

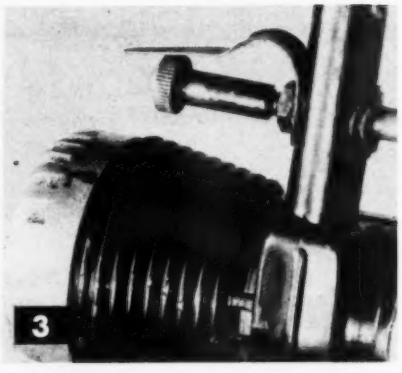
by ARTHUR SILBERBERG

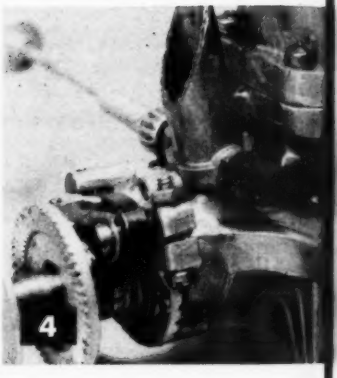
Engines courtesy Hobby Hub, Elmhurst, N. Y.

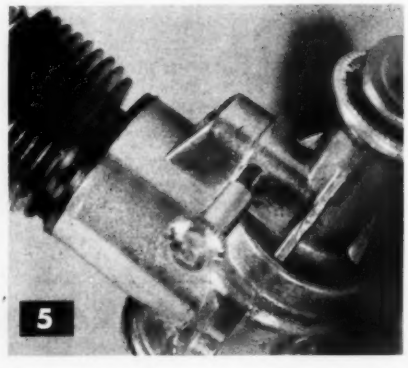


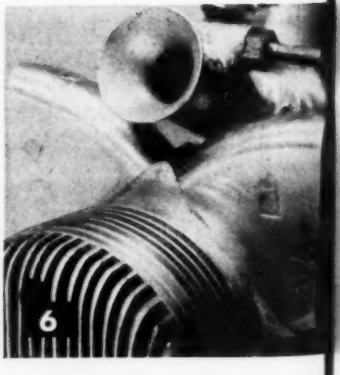


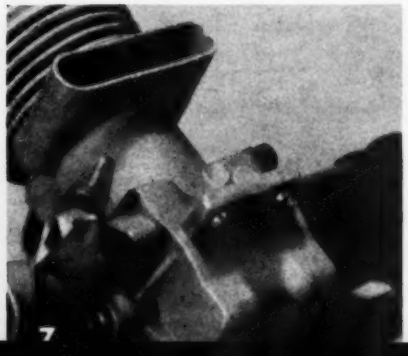
Don't peek at the answers below until you've listed your guesses! Eighteen to 20 correct is expert; 15-18 good; 12-15 fair; 10-12 not so hot; and 0-10, rough, yes?

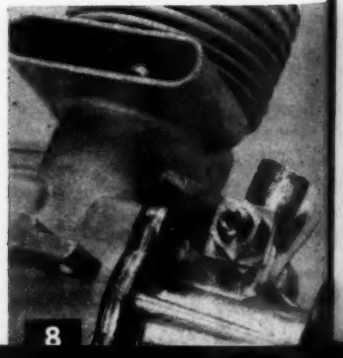








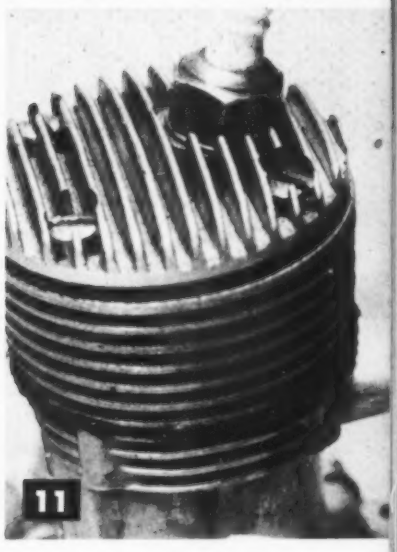




1. Bantam
2. De Long
3. Aero M M
4. Super Cyke
5. Cub
6. Hassard
7. McCoy 19
8. Sportsman 19
9. Wasp
10. Forster 29
11. Torp 24
12. Baby Spit
13. Forster G 29
14. Infant
15. Contestor
16. Merlin
17. O & R 23
18. Drone
19. McCoy 9
20. McCoy 19 Sr.

9

10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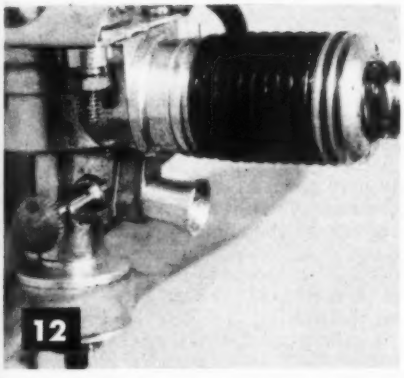
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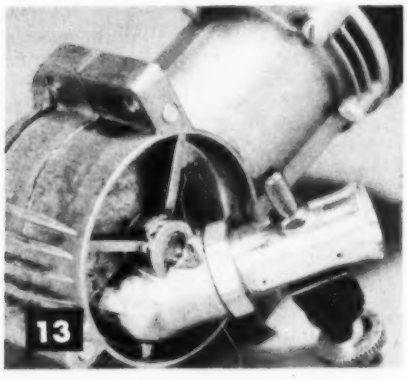
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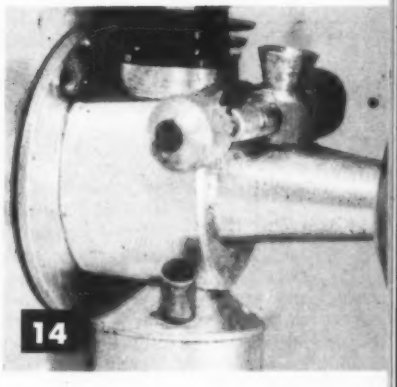
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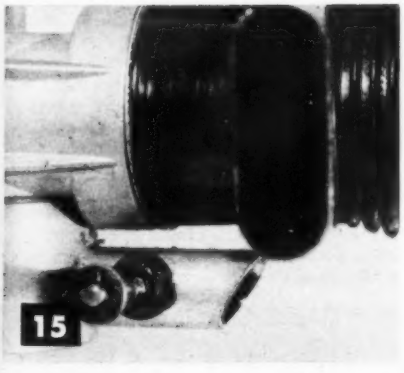
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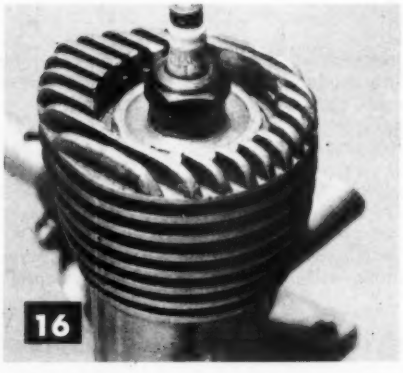
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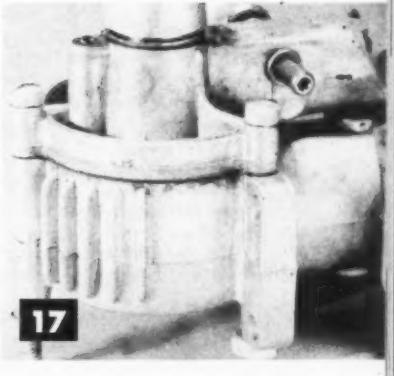
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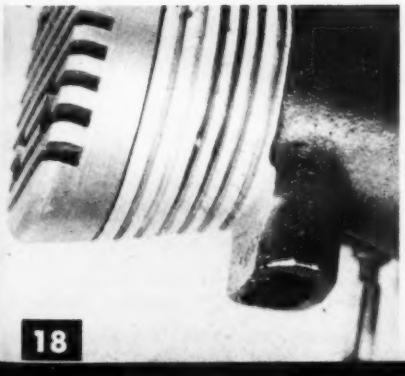
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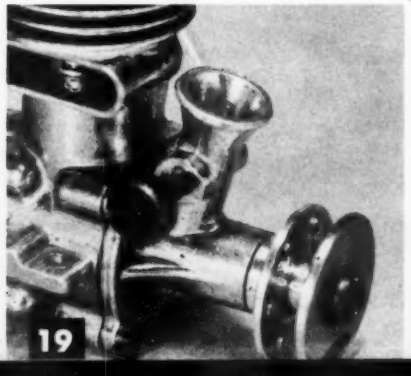
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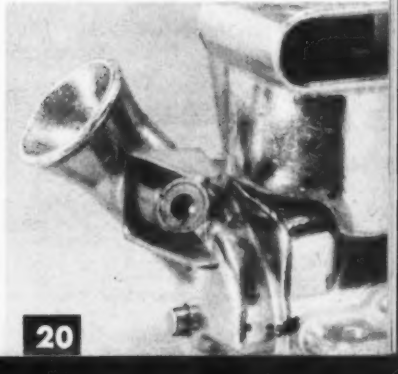

20

design detail

Sport-Trainers

If you have trouble duplicating kit performance with your own designs, these tips will get you to perking.

by H. A. THOMAS

Obviously the easiest and best way for a newcomer in controline flying to make a beginning is to purchase one of the many excellent kit models available, one that the model dealer recommends for simplicity and ease of handling. However there are a number of factors having to do with balance, flight trim and control system arrangement that the beginner should familiarize himself with as soon as possible. For even though his first kit model may be successful, later efforts of his own creation may prove disappointing due to a slip-up in one of these factors which had been smoothed out for him by the kit job's designer.

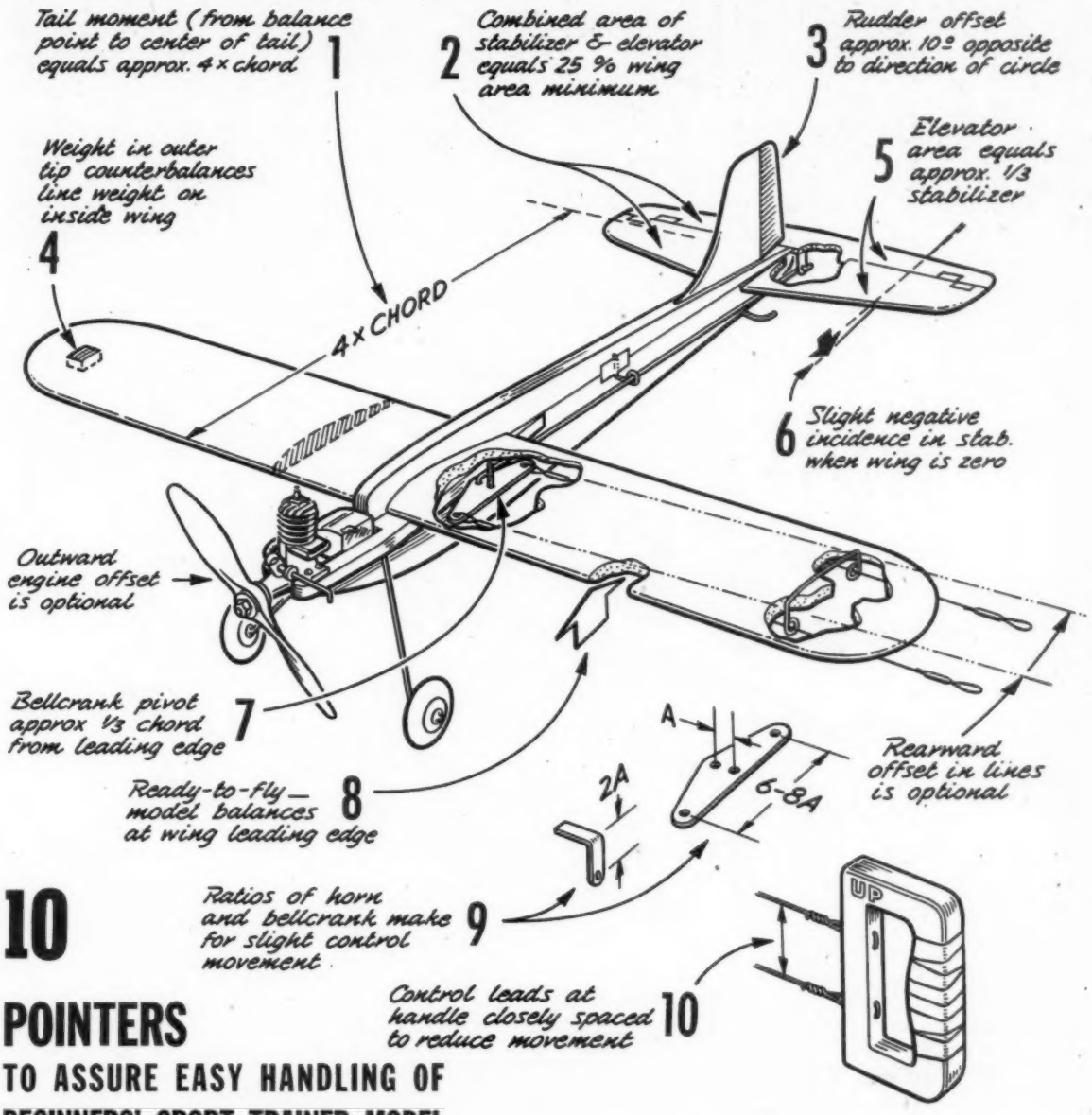
Despite the appeal of a spectacular stunt model, the sport-trainer model of simple construction is the best bet for a beginner. It is rigged to fly with a positive "feel" to it, perhaps a slight down pressure at the handle being needed for level flight. This, in contrast to the critical zero-zero trim of the stunt model which had just as soon fly upside down as right-side up, often being touchy in dead level flight. Balance is near the wing leading edge with bellcrank and—what is more important—the wing guide being mounted somewhere midway of the wing chord. If the wing is mounted flat—zero incidence—the stabilizer ought to have a degree or so of minus incidence. The resulting built-in elevation coupled with the nose-heavy balance provides the positive feel we mentioned earlier. Stabilizer area, including elevator, should be moderate with a generous tail length as measured from the balance point to the center of the tail area. The flipper itself can be one-third the area of the stabilizer.

Since it is important to keep the control lines taut throughout the flight, even when the model encounters side winds which tend to push it inward, the rudder tab is offset about ten deg. More extreme settings are not necessary; they reduce the model's efficiency and induce excessive crab or yawing. With most of our control rig mounted on the inboard wing and line drag affecting this side too, it is smart to add a counter-weight in the opposite outer tip. The amount can be moderate and can be varied between flights. Two other means of assuring us that the model will hold to its true circular course without nudging inward are to move the wing guide rearward and/or slant the thrust line outward. If previously mentioned tips are observed, these last two steps can usually be overlooked.

The sport-trainer's handling in flight depends largely upon the previously discussed balance, proportioning and trim but also to an important degree upon the control system; its linkage, leverages and installation. A sketch shows that it is really the wing guide location, rather than the commonly regarded bellcrank location, that has to do with the model's flight alignment. Backward placement of the guide makes the model nose outward, increasing line pull and vice versa. This is true of the vertical placement as well as the longitudinal placement of the guide. With emphasis on preventing over-controlling, the bellcrank is laid out with long arms and short dimension between the pivot and the pushrod hole. A long elevator horn further reduces movement of the elevator surface which has already been purposely held down in size. Finally the control handle itself is arranged with lines rather closely spaced. With such a system the beginner can over-control considerably without the model encountering real trouble.

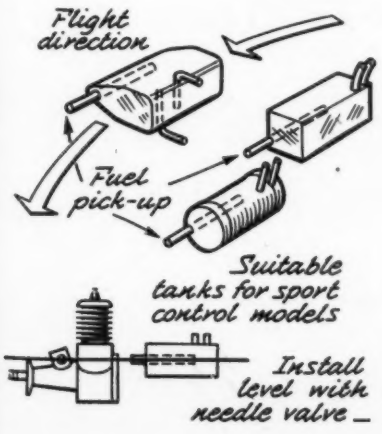
Rounding out this collection of tips to the beginner, the following are random pointers that may aid in by-passing common hazards and difficulties: 1 — Use an ordinary wedge, rectangular or cylindrical tank (the wedge being preferred) but see that the fuel pickup is on the outer side where centrifugal force tends to bank up the fuel in flight. Install the tank vertically level with the needle valve so that it is neither an altogether gravity or suction feed. 2 — Select a propeller of moderate blade area and low pitch for good thrust and only medium airspeed. 3 — See that the pushrod does not bow under compression—add a guide loop as a precaution. 4 — Make the elevator hinge a good one, free in movement but with no looseness or side play. 5 — On your first solo hop, hold the handle at arm's length and move your entire arm up or down as you want the model to climb or dive; a wrist action makes it easier to over-control. 6 — If the model shows a definite tendency to hold its nose down, or to want to climb excessively, check incidence and balance and alter as may be necessary. 7 — Ask questions of experienced modelers.

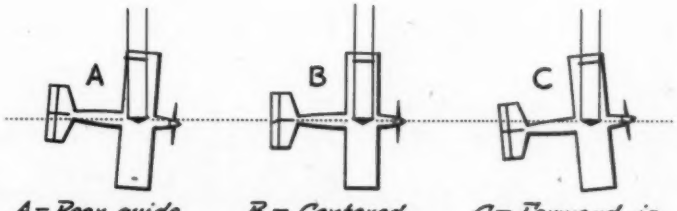
Flatbush Flying Club, B'klyn., l to r — H. Silver, J. Galloa, H. Farber, R. Fucito, G. Williams, L. Prinape, J. Codomo, S. Geronimos, S. Kapelas, A. Palermo.


Tail moment (from balance point to center of tail) equals approx. 4 × chord
1
Combined area of stabilizer & elevator equals 25 % wing area minimum
2
Rudder offset approx. 10° opposite to direction of circle
3
Weight in outer tip counterbalances line weight on inside wing
4
Elevator area equals approx. 1/3 stabilizer
5
4 × CHORD
Slight negative incidence in stab. when wing is zero
6
Outward engine offset is optional
Bellcrank pivot approx 1/3 chord from leading edge
7
Ready-to-fly — model balances at wing leading edge
8
A
2A
6-8A
Rearward offset in lines is optional
Ratios of horn and bellcrank make for slight control movement
9
Control leads at handle closely spaced to reduce movement
10
UP

10 POINTERS

TO ASSURE EASY HANDLING OF BEGINNERS' SPORT-TRAINER MODEL

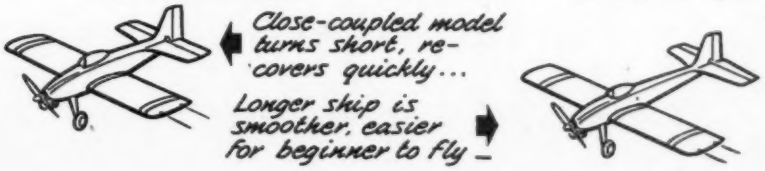




A = Rear guide causes outward yaw in model...

B = Centered — is safe if tab is turned out...

C = Forward is risky ... for experts only...



Close-coupled model turns short, recovers quickly...

Longer ship is smoother, easier for beginner to fly —

FOR MODELERS WHO WAN

the

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TESTOR'S!

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- ★ **Formulated especially for model airplanes**

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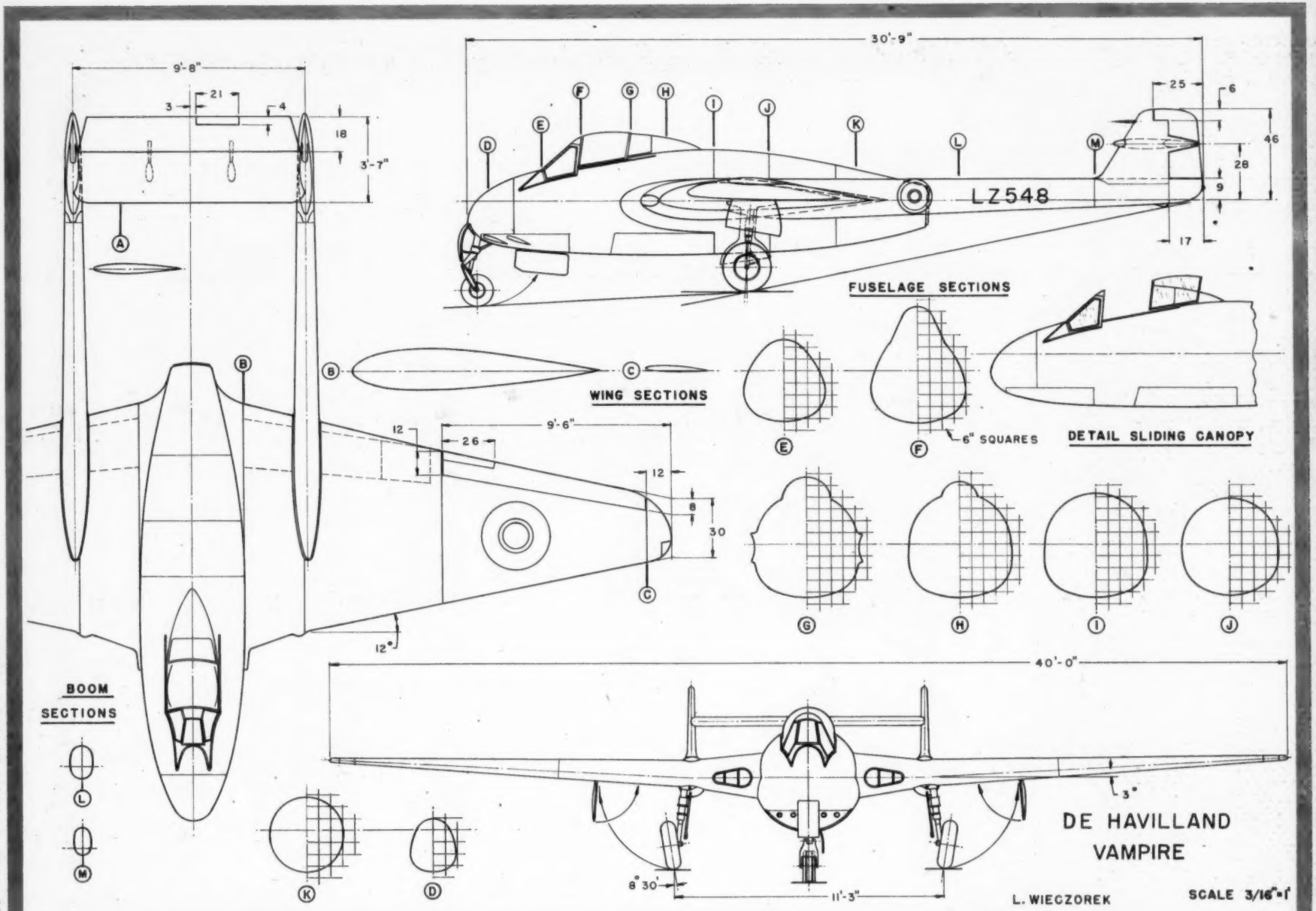
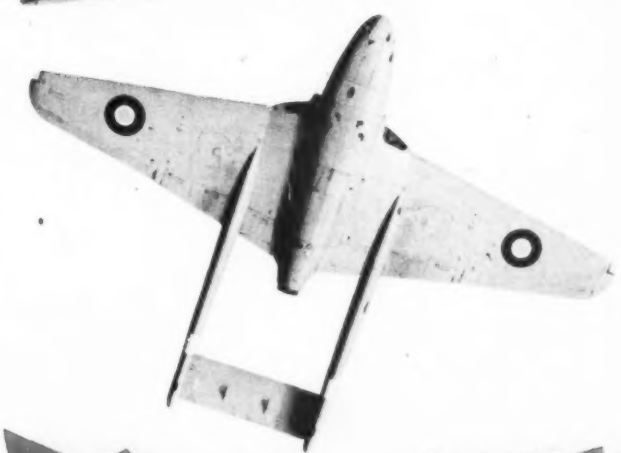

9'-8"
3
21
4
18
3'-7"
A
30'-9"
D
E
F
G
H
I
J
K
L
M
25
6
46
28
9
17
LZ548
FUSELAGE SECTIONS
B
C
WING SECTIONS
12
9'-6"
26
12
8
30
12°
E
F
6" SQUARES
DETAIL SLIDING CANOPY
G
H
I
J
BOOM SECTIONS
L
M
K
D
40'-0"
3°
8°30'
11'-3"
DE HAVILLAND VAMPIRE
L. WIECZOREK
SCALE 3/16"=1'

The De Havilland *Vampire*, and its more powerful successor, the *Venom*, could well be the *Spitfire* of any near future war. Designed in the British tradition of lightness and compactness in a fighter, the *Vampire* is possessed of remarkable maneuverability. Thirteen nations now are *Vampire* buyers. Because of its agility at high altitudes, it is a fighter that can follow the necessary "pursuit curves" to press home telling attacks against high-flying bombers. Fully loaded, the *Vampire* weighs 12,000 lbs., a mere six tons lighter than some other prominent aircraft of the same type. Empty weight is only 7,000 lbs., which means that in all probability the *Vampire* would be maneuvering at a weight between the two figures.

Powered with the 3,000 lb. static-thrust *Goblin* turbine, the *Vampire* knocks off 531 mph at about 20,000′ and climbs at 4,250′ per min. Service ceiling is 48,000′. The *Venom*, with its 5,000 lb. static-thrust *Ghost* turbine and squared-off panels for even faster rate of roll, is a faster and faster-climbing killer. The *Venom* is bigger and has a wider fuselage to accomodate an odd staggered two-place cockpit, after the manner of the *Mosquito*.

The *Vampire* is a remarkably easy airplane to fly. One American reporter, a light-plane pilot, was given a cockpit check and turned loose. He flew the deadly fighter without difficulty! Pilots describe the *Vampire* as a machine that can do no wrong. Stick forces are low. Visibility, always a vital factor in military aircraft, is out of this world. The pilot sees no part of the machine when looking forward and can, by turning his head, see a rudder over either shoulder. Indicative of the *Vampire's* maneuverability is a pet demonstration put on by company pilots. At 75′ altitude, the *Vampire* is brought over the runway, then put through the eight-position hesitation roll, within the length of the runway. Fighter bomber version has four 20 mm cannon, carries rocket bomb combinations.

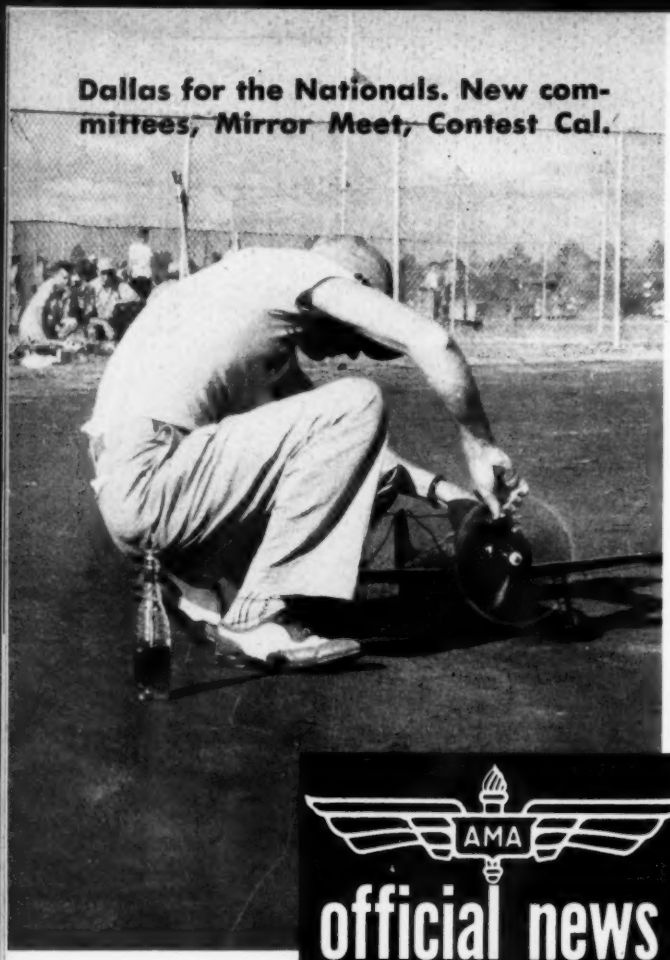


SHOULD ENEMY BOMBERS STRIKE, 13 NATIONS WOULD PUT INTO THE AIR AN ARMADA OF ONE OF THE MOST MANEUVERABLE FIGHTERS IN EXISTENCE, THE COMPACT, LIGHT, GOBLIN-POWERED D. H. VAMPIRE

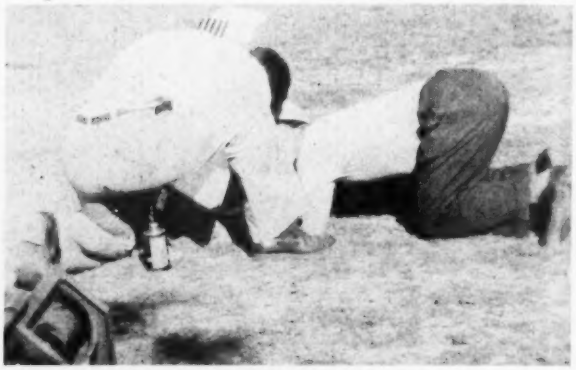
THIS MONTH'S PLANE ON THE COVER

Dallas for the Nationals. New committees, Mirror Meet, Contest Cal.

by RUSS NICHOLS and CARL WHEELEY



AMA official news



Hey, fellows! Look at the camera. Okay, okay! Gentlemen with motor trouble are Tom Ryan, left, Chuck Barhydt, right, Dodge City, Kan.

Detroit Balsa Bugs discussing models, natch. That's Don Murray, contest director, center; and Ken Held, the AMA president, second from right.

Beautiful *Minnow* was flown to second place at a Salina, Kansas contest by Jean Vance, left. Helper and kibitzers look rather worried. It started!

Barston, Cal., Prop Busters, left to right: Abbott, Lee, Olson, Taylor, Kating, Loreman, Bowen. Where's Gibson? He's chap that took the picture.

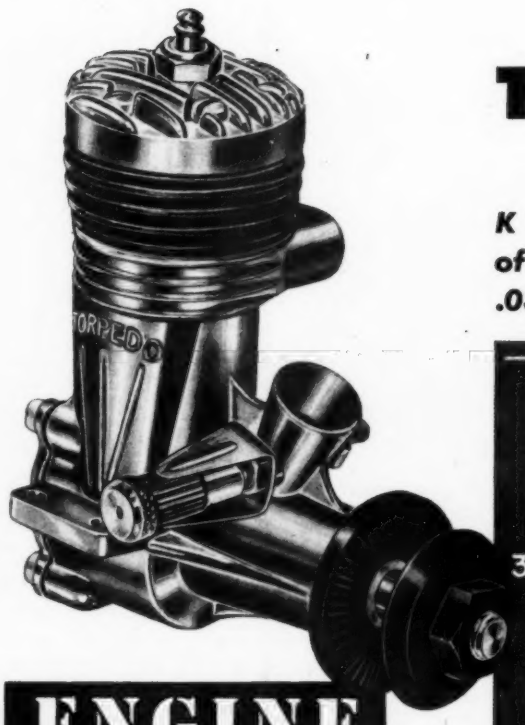
▸ *Nationals Scheduled for Dallas.* Word has just been received from the Navy that clearance has been given for the Nationals to be held at NAS Dallas, Texas, from July 23 through July 29, 1951.

In locating the site for this year's meet, AMA has worked closely with the Navy to determine which station would be satisfactory for our use and with the National Exchange Club because of the absolute need for holding the meet in a city where a qualified local Exchange Club is available. The Dallas Exchange Club is anxious to conduct the contest again and feels that they can profit from last year's experience in many ways, and the Navy's opinion is that activities at NAS Dallas can be adjusted more conveniently than at other stations. In addition, Captain Nieman at Dallas NAS has expressed a desire to again be host.

Many improvements are planned for the Nats including a reduction of expenses to contestants, contestant meals on the station with more food available, as well as many changes in contest procedure designed to make a better meet for all.

Raymond C. Matthews, Jr., of Oklahoma City, Okla., has been named chairman of the AMA Contest Board for the current term. An active modeler for a number of years, Ray is a popular leader in his area and has represented his district on the Contest Board for several terms. He replaces Harold Bunting of Greensboro, N. C., who effectively served as C.B. Chairman last year. Our sincere thanks to Harold for his invaluable contributions to the success of the Contest Board last year and our best wishes for every success to our new chairman.

New Amateur Radio Licenses Available July 1. The F.C.C. has announced the availability of two new types of Amateur Radio Licenses starting July 1, 1951. A summary of the requirements and benefits is given herewith: 1—Technician— a. Duration—good for 5 years. then renewable; b. Exam—5 *(Continued on page 52)*

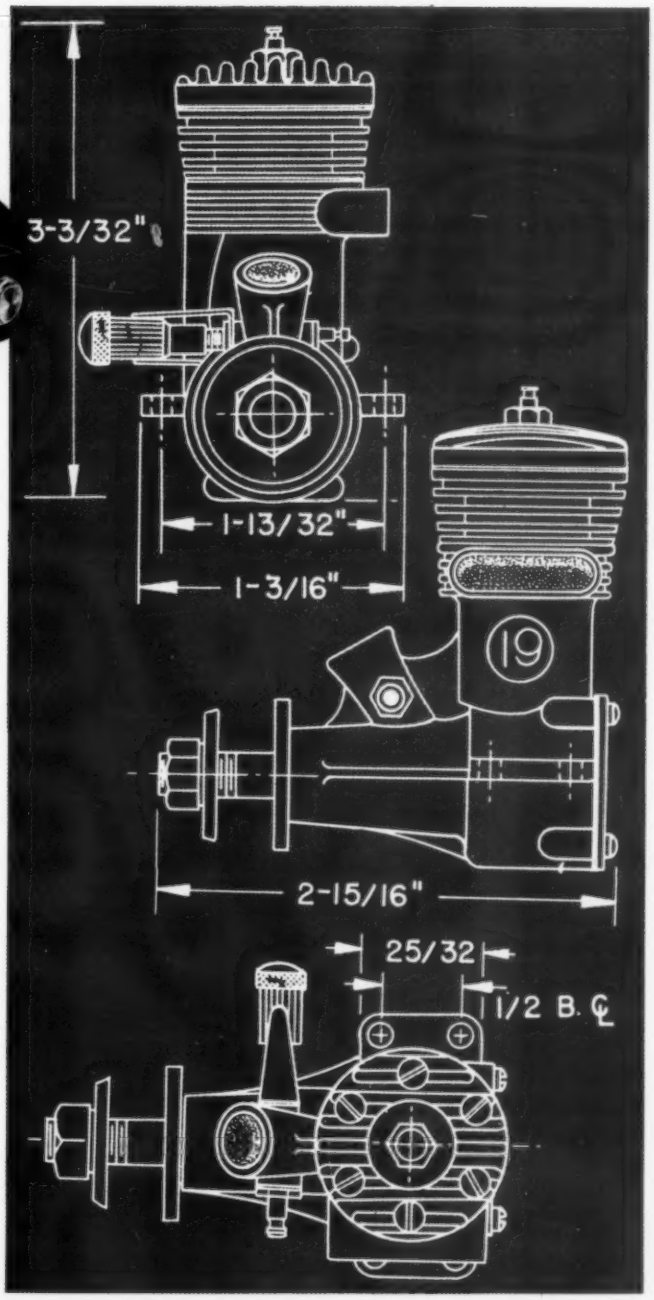


Torpedo 19

K & B's Class A .19 rounds out firm's line of engines, from the AA Infant, through .035 and .049, to the .29-.32 Torpedo

ENGINE REVIEW

by LEW MAHIEU



K & B had received numerous letters asking when they were going to build a 19. With a 19, K & B has a complete line of engines—making the smallest engine in the world, the .02 *Infant;* two other engines in AA, and now the A, B, and C classes as well.

The bore is .640 with a stroke of .620. Bare weight is 5-1/2 oz. RPM checks taken with a strobotac show that the 19 turns the K & B 9" x 5" pitch propeller around 13,000 and the 9" Air-O at 14,000. These rpm checks were made on K & B's standard run-in fuel—*Supersonic 100.* As for flight testing, the 19 was placed in a rather large Class B ship with a wing area around 700 sq. in., and a steep fast climb resulted. To tip off the speed boys, several of the hot-shots on the West Coast are already building new speed jobs for this engine.

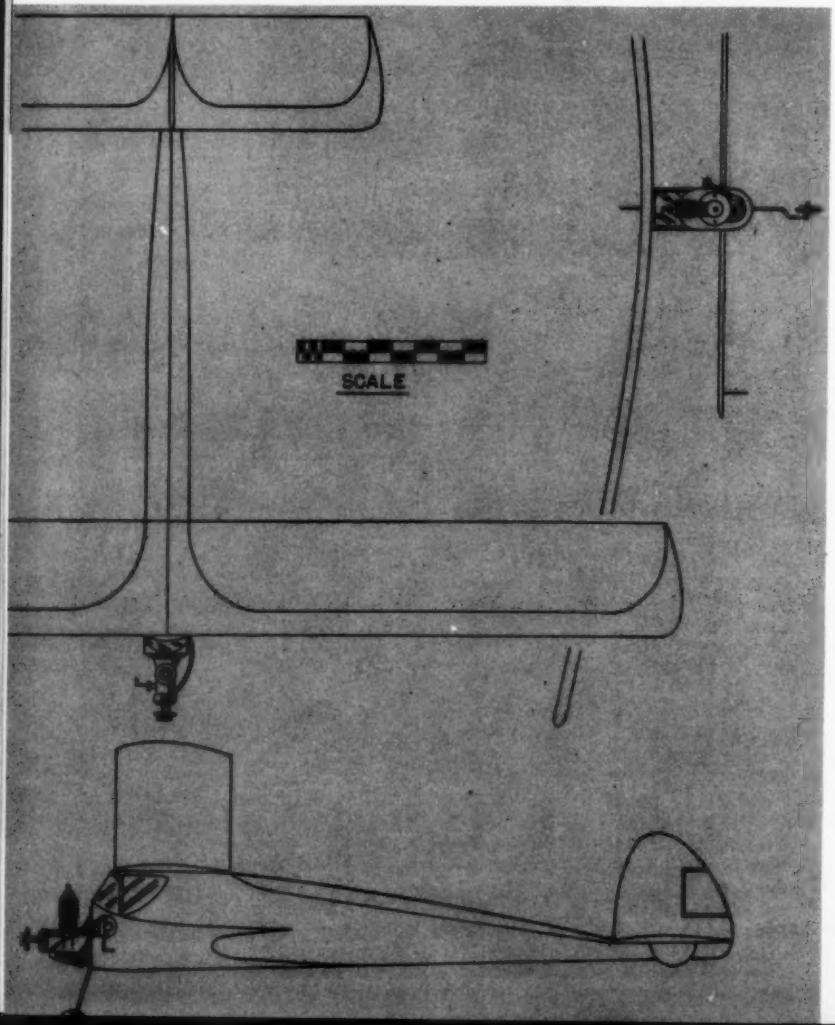
Construction features are: maximum porting, very large exhaust, a 3/8" diameter crankshaft through the main bearing to allow same size ports as in Class B engines, a 1/4" propeller shaft rather than the 3/16" usual on A engines, a new type head held down with six head bolts, an extra large new type by-pass area, four screws holding the back plate in place, and the motor mounts on the center line of the crankshaft. The piston is made of Meehanite and ground to perfect roundness before it is lapped into the cylinder.

With the 19, the manufacturer recommends *Supersonic 100, Supersonic Ultra Glo,* or *Supersonic 1000.* The 19 is packaged with a K & B 9" x 5" pitch propeller.

the skydyne

by MAURICE SCHOENBRUN

Seldom seen is Ritz type wing with its thinned out section and sparless construction. As used on *Skydyne*, has slow glide, stable power flight. Owners of 29's, 49's, 60's, and so on, can enlarge 3-view to make larger working plans.



▶ The *Skydyne* is the most efficient design, aerodynamically and structurally yet created by the author. The ship is inherently stable: it provides a small and very lively craft capable of flying in both calm and windy weather. This feature is all too uncommon among contest aircraft. This factor is very important because we have no control over the weather come contest day.

The wing section is a modified RAF 32 section; that is to say, the upper camber is modified and the lower camber is designed to give the "ritz" type airfoil. This particular section is extremely slow in the glide and stable under power. It also lends itself very well to a sparless wing which has the amiable quality of taking approximately half the time to build as compared with conventional type wings. As you will see by the drawing, the wing will, upon covering, warp up to a curved dihedral which in the final analysis, contributes greatly to the afore-mentioned excellent spiral stability, The class A version which is shown in the pictures has a wing area of 209 sq. in. and a wing loading of 6.9 oz. per sq. ft.

The power plant can be virtually any of the engines from .065 to .099. A scaled-down version is suggested by the double dimensioning given in the drawings. These dimensions, if followed, will give the class AA fans an effective contest threat as well as the class A fans. The following will give the interested builders complete information on building the *Skydyne* and complete flight instructions to get the utmost out of this ship.

Building the Fuselage. The basic fuselage is built conventionally. Lay down 1/8" sq. strips in the cross-hatched areas of the drawing making two sides, and assemble as per top view. The next step is to cut and glue in place the fire wall of 1/16" plywood. To that we add the blocks

If you like hot cabin jobs you'll have to go a long way to beat this efficient ship

which form the nose of the ship. Carve to contour and rough sand as seen in the cross section of the fuselage. The lower profile of the fuselage is made of 1/8" sheet balsa. The top profile is similarly built. After cutting to shape, glue into the center of the body and allow to dry. The lower profile has stringers. Refer to cross section for details. Glue the 1/8" squares which form the bulkheads in their respective places. When dry, add the stringers. Note that the upper part of the fuselage has no stringers, merely the 1/8" sheet backbone.

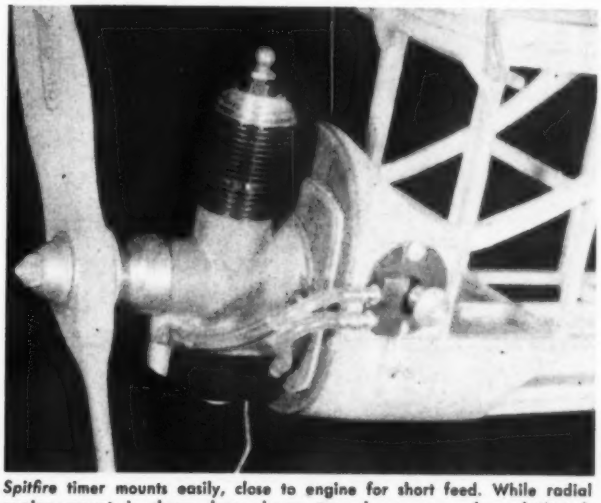
The extreme rear of the fuselage has a small block glued to each side of the lower backbone, and the stringers are sanded smoothly in to a symmetrical shape.

The next step is to bend the landing gear to shape and solder the wheel in place. The fire wall has glued to it a 1/16" sheet of balsa wood and it is cut out to set in the landing gear so that it is flush. Then glue over the balsa wood a 1/16" sheet of plywood making a sandwiched firewall with the landing gear wedged between.

Drill mounting holes for the engine. Glue the nuts for mounting bolts to the inside of the firewall. This will insure a simple dismounting of the engine at any place or time with a minimum of effort. Drill holes and mount wing and tail dowels in proper positions. Last but not least, surface the entire nose of the ship with a coat of shellac to prevent saturation of exhaust gases and oils into the wood structure.

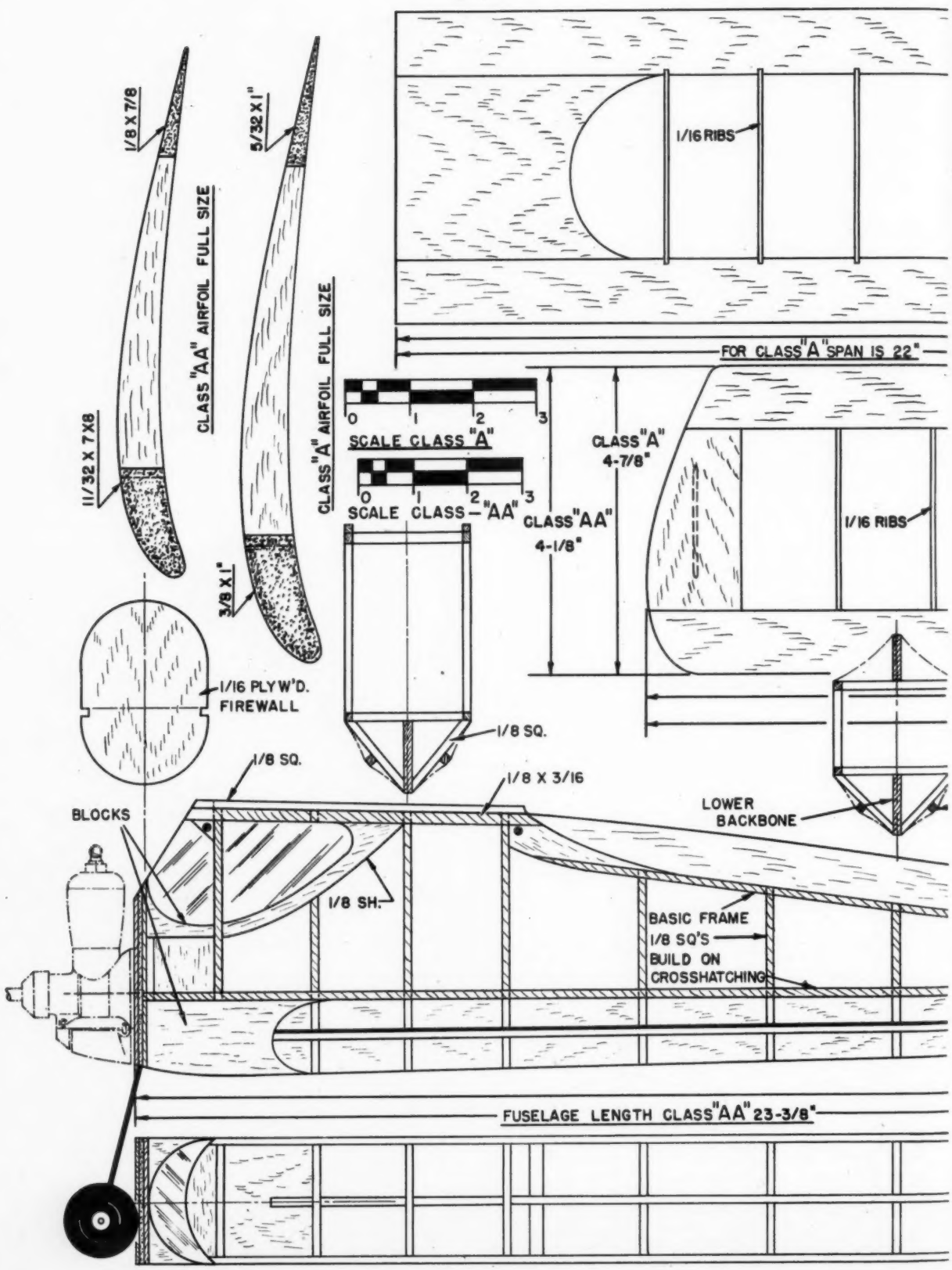
The Tail-Rudder and Elevator. The rudder is simply a flat cross section with leading and trailing edges sanded to proper shape as per drawing. The movable portion of the rudder is held to the main rudder by means of two pins pushed through the 1/8" x 1/4" upright into the movable tab. The elevator has a lifting section similar to a Clark Y thinned out. It consists simply of a leading and trailing edge. Use wood of even straight grain approximately 12 lb. stock. Pin the leading and trailing edges in place. Notch for ribs and glue the ribs in place; when dry remove and sand to finished shape.

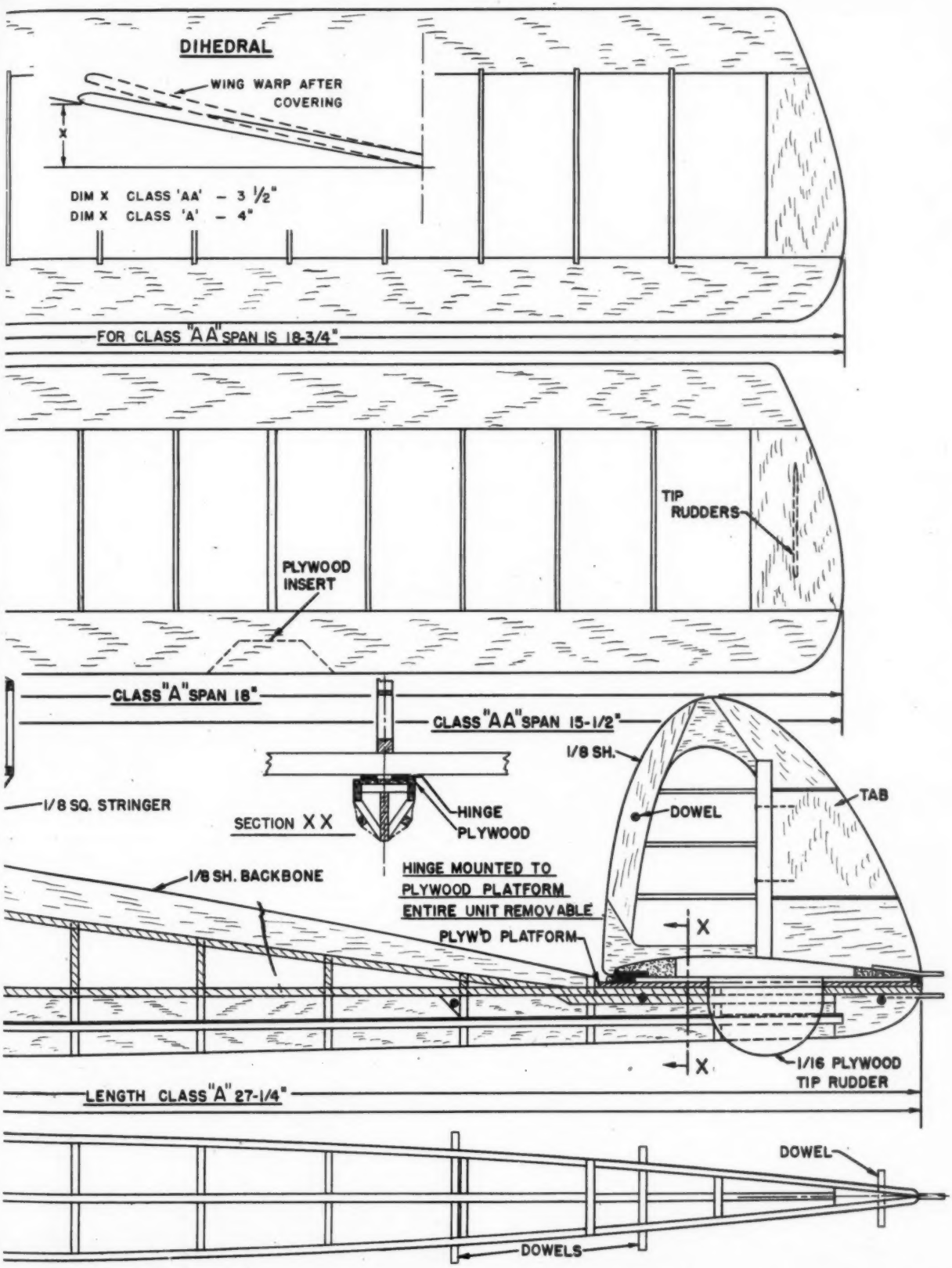
Be sure to cut grooves in lower surface of elevator tip for insertion of tip rudders. These are made of 1/16" plywood. Be sure to put them on the elevator as they have a two fold purpose. They act as the two points of a tripod holding the ship in a standing position for take-off, the third point being the wheel. The tip rudders are also required as additional area for proper directional stability. The rudder is glued permanently (*Continued on page* 46)



Spitfire timer mounts easily, close to engine for short feed. While radial engine mount is shown here, beam type bearers can be substituted.

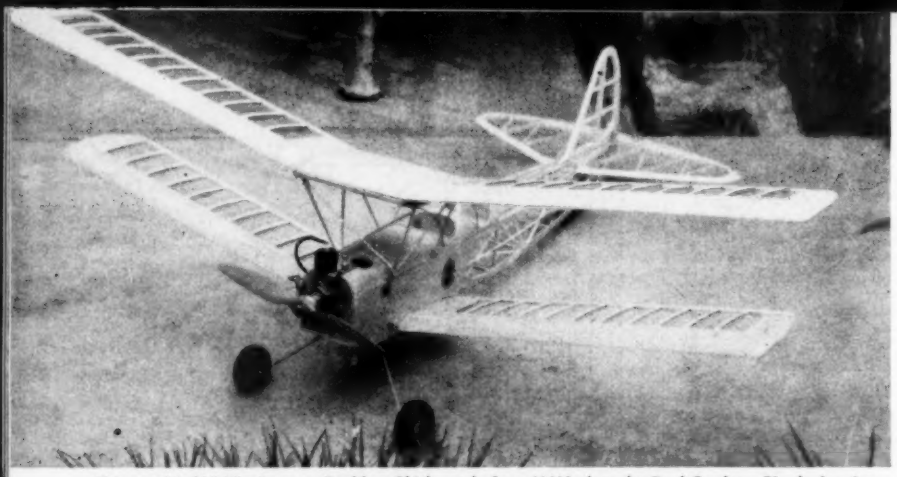
The author with the finished *Skydyne*. Slight left thrust gives it a left-hand power turn. Glide is to the right. Adjustment: Right rudder; wash-in left tip.


1/8 X 7/8
CLASS "AA" AIRFOIL FULL SIZE
5/32 X 1"
CLASS "A" AIRFOIL FULL SIZE
11/32 X 7X8
3/8 X 1"
1/16 RIBS
FOR CLASS "A" SPAN IS 22"
0 1 2 3
SCALE CLASS "A"
SCALE CLASS — "AA"
CLASS "A" 4-7/8"
CLASS "AA" 4-1/8"
1/16 RIBS
1/16 PLY W'D. FIREWALL
1/8 SQ.
1/8 SQ.
1/8 X 3/16
LOWER BACKBONE
BLOCKS
1/8 SH.
BASIC FRAME 1/8 SQ'S BUILD ON CROSSHATCHING
FUSELAGE LENGTH CLASS "AA" 23-3/8"


DIHEDRAL
WING WARP AFTER COVERING
X
DIM X CLASS 'AA' – 3 1/2"
DIM X CLASS 'A' – 4"
FOR CLASS "AA" SPAN IS 18-3/4"
TIP RUDDERS
PLYWOOD INSERT
CLASS "A" SPAN 18"
CLASS "AA" SPAN 15-1/2"
1/8 SH.
TAB
1/8 SQ. STRINGER
SECTION XX
HINGE PLYWOOD
DOWEL
HINGE MOUNTED TO PLYWOOD PLATFORM ENTIRE UNIT REMOVABLE
1/8 SH. BACKBONE
PLYW'D PLATFORM
X
X
1/16 PLYWOOD TIP RUDDER
LENGTH CLASS "A" 27-1/4"
DOWEL
DOWELS

air ways

The world's most interesting models are pictured here every month. Perhaps your latest ship would win the prize for good construction.



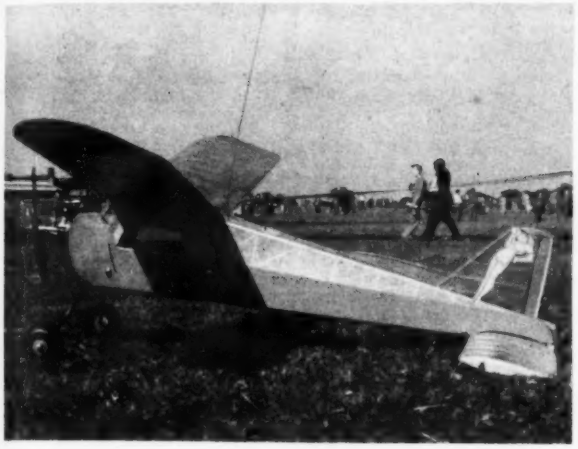
This month's $10.00 winner, a *Faultless Chick*, made from MAN plans, by Raul Cardoso, Rio de Janeiro. Since covered with red, yellow *Silkspan*, ship is marvelous flier. Prize pix based on workmanship.

Another swell shot from British photographer R. A. Adams catches Norman Butcher with his *Croydon Club* team racer. Power is British ED Diesel.

Stinson *Station Wagon* is pride and joy of Larry Bourque, Chicago, Mass. Made from Cleveland kit, has two-speed O & R .29, it took 143 hours.

Johnny Tatone, San Francisco, and his well-known *TNT*. Series goes way back, one holding a hydro record in 1942! This one has spark O & R 60.

Twin-engine stunter, Fred Zimmerman, Tajunga, Cal., wins second-place subscription award. Fox .29 inboard, Fox .35 outboard. Patterns easy.



Authentic construction of old *Pilgrim*, Jim Hunt, Union, N. J. wins third place subscription. Left — *Citizen* rc from MAN, W. Tootell, Lancaster, Eng.

Scale winner All New England contest was this beautiful *F4U-4*, by John Abbott, Quonset Point, R. I. Two-speed carburetion type control on Mac 49.

Group of free flight fans at the 1951 Australian Nationals. The two shoulder wings generally resemble typical designs flown throughout Europe.

Cliff Spotts and Ohlsson .29 flying saucer snapped on Coast by Jim Saftig. Despite unconventional design, ship has no trouble with pattern.

Blunder Bus

(*Continued from page 15*)

extremely easy to construct. Make a template of the crutch from the very heavy outline on the top view in plates 1 and 2. Cut the crutch from a piece of rock hard 1/4" x 2" x 24" sheet balsa. Templates are now made for all the fuselage formers. Note that former #1 is 1/8" plywood and the balance are 1/8" sheet balsa. At this point the landing gear may be bent from 1/8" steel music wire, and the holes drilled in former #1 for the j-bolts.

Lay the crutch flat on the bench and cement the hard wood mounts in place. The formers from 1 to 5 are now glued to the crutch in their correct locations. Make certain all the formers are at right angles to the crutch and to the thrust line.

The fuselage sides are made from 1/8" medium hard sheet balsa. Cut-outs for the wing on each side should be done before assembly. Cement the sides to the crutch and former assembly, cracking them slightly at former #3 if necessary. Check the sides to make certain they are flush with the bottom of the crutch. Add the 1/4" x 1/2" balsa wing rests between the engine mounts, and set the assembly aside to dry for several hours.

Sand the sides and bottom of the fuselage and give them two coats of clear dope and cover with *Silkspan*. This covering should not be overlooked in your haste to finish the job. The strength derived from it, in addition to the finer finish, is very desirable. At this point the wing assembly and the landing gear are added. The wing should be securely held in place with liberal quantities of cement. Allow to dry while making the stabilizer and rudder.

Stabilizer and Rudder. These two assemblies are made of 1/8" medium hard sheet balsa. The rudder should be offset 1/4" to the right for counter-clockwise flying. The elevator hinges may be made of any odd scraps of white cloth found around the house, except rayon. Cut them to shape with a sharp razor blade or scissors and neatly cement them to the elevators and stabilizer. Sand both these units well and prepare for the final assembly.

Final Assembly. Cut two pieces of 1/4" square balsa for the stabilizer rest to the correct size and shape, and cement one to each side of the fuselage in the proper location. The stab is now firmly cemented in place on the rest and checked for proper alignment. At this point, the bellcrank and other components of the control system are installed and hooked up. The push rod should be preformed at the bellcrank end before installation and formed in a similar manner after passing through the control horn. The lead-out wires should be looped, bound with soft wire and soldered to the bellcrank before it is installed. Number two screw-eyes should be dipped in cement, threaded into the wing tip. These lead-out guides should be located in such a manner as to cause the lead-out wires to sweep back about 1/4" (toward the trailing edge). This, in addition to the rudder offset, will keep your *Blunder Bus* tight on the lines in flight.

Before adding the fuselage top covering, the control system should be checked for freedom of movement. The elevator should hang down from its own weight when your controls are correct. Check for elevator positioning—30° up and 15° down are approximately correct for the novice.

The 1/16" sheet balsa top is now added with the grain running at right angles to the thrust line and the rudder and head-rest cemented in place. Position the engine you have selected and mark and drill the holes through the mounts. The engine should be turned slightly to the right (viewed from the rear of the fuselage) to insure tension on the wires in flight. With some engines, it may be necessary to cut a portion of one fuselage side away to obtain clearance for the exhaust stack.

Finishing. Sand the entire model thoroughly before color doping. A mixture of clear dope and talcum powder brushed on the exposed wood will provide a good base for the final finish. Three or four coats of colored dope of your own choice will give a finish you will be proud of. The original model sported a red fuselage and rudder with black wing and stabilizer. A quarter invested in a package of *Trim-Film* checker board will give your ship the finishing touch that we all admire.

The engine, at last, is bolted securely in place and the wheels placed on the landing gear. Thread the lead-out wires through the lead-out guides at the wing tip and form loops in the ends as you did at the bellcrank end. The lead-outs should be identical in length, when the elevators are in neutral.

Fuel Tank. The original model uses a balloon type tank, although any type may be used. A rubber balloon of the 5¢ variety will do the job nicely. Insert a piece of 3/16" outside-diameter fuel line in the balloon until one end is about 1/2" from the bottom of the balloon.

Wrap the neck of the balloon tightly with thread, around the tubing, to prevent the fuel from leaking out. This completes your tank. Simple, isn't it?

Flying. If this is your first attempt at controline flight, it would be advisable to study the following instructions. If at all possible, an experienced modeler of your acquaintance would be a handy guy to have around, to check the ship and to assist on the initial attempt. Before any flight, whether the first or the many to follow, you should check certain things on the model: 1. Controls—sufficient movement and freedom; 2. Engine—mounted tightly, clean, glow plug or ignition; 3. Pull Test—hook the flying wires on the lead-outs and pull-test for strength. This test should be equivalent to 25 times the weight of the model. 4. Flight Wires—look for kinks, rust or poor joints at the loops; 5. Landing Gear—wheels should be free and in line. Gear should be mounted firmly, with a minimum of play.

Hook a set of good wires 52' long, of .012 diameter or better to the handle and the lead-outs. With the handle held vertically, neither forward or back, the elevators must be in neutral. If not, the flying wires must be adjusted until the uneveness is corrected. Place the model in the flight circle so that the wind, if any, is blowing directly from the rear of the model. Fill the tank and start the engine. The engine should be leaned-out until it reaches its maximum rpm. Then open the needle valve a half turn more or less until there is a suggestion of four-cycling in the exhaust sound.

Have your assistant hold the ship with the nose pointed slightly toward the outside of the flight circle. Now run out and pick up the control handle and take all the slack out of the wires; watch carefully for twists, kinks or snags of grass or weeds.

Move the handle back and forth, making certain, for the last time, that your controls are free and you have picked the handle up correctly. Now return the handle to neutral, and have your assistant release the ship. Now it's rolling faster and faster! Don't move that handle! Hold it in neutral until the ship is airborne, with 12' of altitude. Get the feel of straight and level flight for a few laps. If you aren't feeling any dizziness at this stage in the game, a few gentle climbs and dives will help you and *Blunder Bus* get acquainted.

Landing is a simple procedure. After the engine cuts, establish a shallow but fast glide until the wheels are about 12" from the ground. A slight touch of "up" movement will cause the tail to drop and the ship will settle gently for a nice three-pointer. Easy wasn't it?

In closing, we would like to add that the *Blunder Bus* can easily be converted into a stunt trainer, capable of inverted flight. Simply cut 12 more ribs from 1/8" sheet balsa and cement them to the underside of the wing, working out from the fuselage to the tips. New wing tips should be made and assembled in place. Cover the underside of the wing with *Silkspan* and dope as before.

Additional control should be added by added by shortening the control horn and rebending the pushrod, so that an equal amount of up and down (approximately 45°) is obtained. Have fun, but don't forget to fly safely!

Bill of Material. One piece of 1/4"x 2"x 24" hard sheet balsa; three pieces of 1/8"x 3"x 36" medium hard sheet balsa; two pieces of 3/16"x 3"x 36" medium hard sheet balsa; one piece of 1/4"x 1/4"x 36" hard balsa; one piece of 1/16"x 3"x 36" medium hard sheet balsa; one sheet of 1/8" plywood; two of 3/8"x 1/2"x 12" hardwood engine mounts; two sheets of gas model *Silkspan;* one pair of 2" or 2½" wheels; one piece of 1/8"x 36" steel music wire; one piece of 1/16"x 36" steel music wire; two pieces of 1/32"x 36" steel music wire; one package of J bolts; one package of engine mounting bolts; one *Veco* bellcrank; one *Perfect* control horn; two No. 2 screw-eyes; 4 oz. of clear dope; 4 oz. of colored dope; one package of *Trim-Film* Checkerboard; one fuel tank; 1' of 3/16" outside diameter fuel line.

MODEL DAZE
By Bob Gurren
-COMPLETELY OUT OF SCALE, THE BOMB BAY DOORS DON'T OPEN -
I AGREE
HAH! LOOK AT THIS - A THIRD LINE THAT DOESN'T CONNECT TO ANYTHING - COMPLETELY OUT OF SCALE -
I AGREE
WELL LOOKIT THAT - THE POOR SUCKER IS ACTUALLY TRYING TO FLY IT - YAK YAK YAK
ONLY ONE BOMB? COMPLETELY OUT OF SCALE -
I AGREE

Boys! IT'S EASY TO BUILD SCALE MODELS WITH GUILLOW'S *Sensational* DIE-CUT BALSA SHELF MODEL AIRPLANE KITS

12 DIFFERENT MODELS - ALL MILITARY - INCLUDING 4 JET JOBS

LOCKHEED C-69 CONSTELLATION

REPUBLIC F-84 THUNDERJET

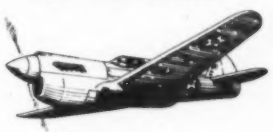
DOUGLAS AD-1 SKYRAIDER

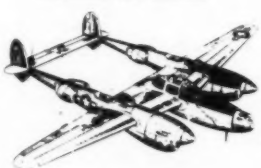
NORTH AMERICAN P-51 MUSTANG

McDONNELL F2D-1 BANSHEE

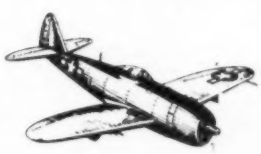
BOEING B-29 SUPERFORTRESS

VOUGHT F4U-1 CORSAIR


CURTISS P-40 WARHAWK


LOCKHEED P-38 LIGHTNING

LOCKHEED P-80 SHOOTING STAR


REPUBLIC P-47 THUNDERBOLT

NORTH AMERICAN F-86 SABRE

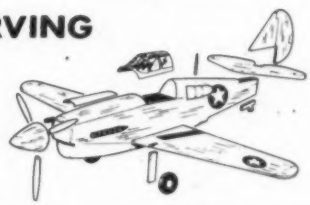
25¢ EACH

EASY ASSEMBLY - NO DIFFICULT CARVING

EACH KIT CONTAINS A PLASTIC CANOPY OR PLASTIC DISKS – ALSO INSIGNIA FOR WING AND FUSELAGE

SERIES 25SDC SHELF MODELS.

12 exciting new pre-fab solids jam-packed with value – and at an unbelievable low price! Famous World War II fighters and in-the-news jets are available in this series. Easily assembled from razor sharp die-cut parts – all fun and no hard work. Buy at your dealer and save the mailing charge.



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1950 NATIONAL OPEN STUNT CHAMPION

Trixter BARNSTORMER

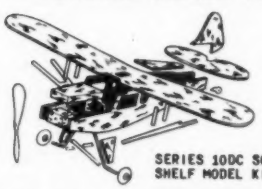
1st in Senior Stunt Event - 1st in Open Stunt Event - 47" wing span - 470 sq.-in. wing area - .23 to .35 cu.-in. disp. Kit contains full size plans, illustrated step-by-step instructions and pre-fab parts. **$5.95**

CLASS 1/2A

BABY BARNSTORMER

1/2 size version of Champion Barnstormer for 1/2A engines - 23-1/2" wing span - 118 sq.-in. wing area. Flies like a dream on 25' - 35' lines; does every stunt in the book. **$2.95**

OTHER GUILLOW DIE-CUT BALSA FLYING SCALE AND SOLID SCALE MODELS



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F-86 Sabre, F-84 Thunderjet, SE-5, P-47 Thunderbolt, P-40 Warhawk, P-51 Mustang & Fokker D-7. Sport Airplanes: Monocoupe, Piper Cub, Cessna, Aeronca & Stinson **10¢ ea.**

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8 SHEET BALSA FLYING MODELS

Your choice of high and mid-wing monoplanes and a biplane. Simple construction - plastic propeller for better flying - cambered wing **25¢ ea.**

OTHER GUILLOW ITEMS AVAILABLE.

Balsa Gliders: P-84 Thunderjet 5¢. Glider Fleet: 3 gliders for 10¢. Ready-To-Fly Motorplanes: 12" Sky Streak monoplane 25¢.

Profile Motorplane Construction Sets: Series 11F - 6 models - sheet balsa - each kit 10¢.

Solid Model Construction Sets, Series 14S - 8 models - each model 10¢.

Solid Model Construction Sets, Series 25S - 8 models - each model has the fuselage cut to side profile - each kit sells for 25¢.

Tissue-Covered Flying Model Kits, 10F Series - 8 models - easy to build - do not have die-cut parts - 10¢ each

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PAUL K. GUILLOW, WAKEFIELD, MASS.

over the counter

A monthly review of hobby developments, new items

by THE TRADE OBSERVER

Most exciting development of the month is the news of two highly prefabricated controline scale kits by Cleveland Model & Supply Co. (4506-12 Lorain Ave., Cleveland, Ohio), the Great Lakes *Trainer* and the Boeing *P-26A*. The former spans 27", sells for $5.95; the latter has a 28" wing and lists at $6.95. Recommended power ranges from large A engines to small C motors. Both of these colorful prototypes were engineered for simplest possible construction, sound design, flying ability for stunt or general sport operation. Features are numerous.

Fuselage and wing construction is of the interlocking type with parts that automatically align themselves. Tail surfaces are ready-cut to shape. Edges are tapered, shaped, and pre-notched. Ribs are die-cut, ready to cement in place. Bulkheads are die-cut, interlock with sheet-balsa sides in the Great Lakes, with a strong central keel in the *P-26A*. Big decals include wing numerals, red-white-blue insignia. Stringers are few and fit in accurate notches made with a handy notcher supplied with each kit.

Rite Pitch (Engineered Toys, 6655 E. Dunes Highway, Gary, Ind.), makers of props and other model products, is using a new manufacturing process to produce completely redesigned line of Rite Pitch props at a greatly reduced price. Their *Regular, Super-stunt, Super-special 15*, and small-engine props, have been given a new blade profile to permit engines to develop peak hp, yet still transmit the highest possible percentage of hp into thrust. These new props are made from harder, stronger woods, such as beech and birch, with glossy lacquer finish.

Packaged in larger tubes, Rite-Pitch's *Formula's 11* and *22* have had added certain new ingredients for extra strength and faster drying qualities. Price has been changed from 10¢ to 15¢ but cement lasts twice as long, manufacturer states.

Speaking of tanks, Froom Mfg. Co.'s (718 E. Colorado, Glendale 5, Cal.) "square wedge" marks the latest trends. Expert modelers have been using square tanks more and more of late, due partly to the difficulties of mounting a true wedge with perfect alignment. The square wedge is easily blocked in. The wedge portion occupies at the most about 25% of the width of the tank. Another virtue of this new stunt tank is greater fuel capacity in less space. It is ¾" deep, 1" wide, and available in four lengths: 1¼" for AA and .09 engines, .5 oz. capacity; 1½" long for a .6 oz. capacity; and 1¾" long with a .7 oz. capacity. Seams and fuel lines are inside-soldered to prevent vibration damage. Square wedges are adapted to such kits as *Baby Era, Little Schmoe, Key-Det, Wing Ding, Piper Cub Special, Lil Rascal*. Froom also manufactures a full line of round, half round, and wedge tanks, as well as hand-spun aluminum spinners noted for their balance.

Featuring brightly painted one-piece hulls, two brand-new *Chris-Craft* models, just launched by Scientific Model Airplane Co. (113 Monroe St., Newark, N. J.), are designed for AA and A engines or electric motors. With a length of 12½" and a beam of 4½", the hulls are of molded *Science-Wood;* paint is fuel proof. Deck is die-cut. No bulkheads, stringers, or planking. Kits include: brass propeller, stamped aluminum ventilators, plastic steering wheel, windshield, fuel line, printed instrument panel, gas tank material, printed flags, die-cut motor mount, hardware. Authentic reproductions of the *Riviera* and *Special Runabouts*, each kit lists at $3.50.

America's Hobby Center (156 W. 22 St., New York, N. Y.) has just issued another 64-page, two-color catalog, featuring over 200 illustrations and descriptions of U-control models on the market, and for over 50 free flight gassies. Also featured are thousands of model building items, ranging from basic supplies, various brands of cements and dopes, to specialized accessories. Articles advise on plane and engine combinations, trouble-shooting, and on-the-field data.

Sterling Models (1530-34 N. Hancock St., Phila. 22, Pa.), manufacturerers of gas models, whose specialty has been flying scale, has moved into the boat business with a bang. Displayed for the first time at the Trade Show, these boat kits are highly prefabricated, including the Richardson *Sedan Cruiser* and Higgins *Sport Speedster* at $4.95. Both kits feature a carved lower hull section, slotted for necssary bulkheads and drilled for the stuffing box. All balsa parts, such as bulkheads, etc., are die-cut. Kits contain all cast metal fittings such as cleats, shocks, running lights, bow light, vents, horn, steering wheel. Also included is the power unit consisting of the shaft, stuffing box, propeller, and universal. Power is by any AA motor or electric motor. Flywheel, engine, cement, and paint are up to the builder.

RANDOM NEWS:

Now available is the third in DMECO'S (Williamsville, N. Y.) line of trainer, stunt-trainer, and stunt series, a moderate size (36") job for .19 to .29 engines. Good for budding stunt artists. *All-American Sr.* due about June 1 . . . Lockheed *F-94* interceptor fighter in solid model form, by StromBecker (Moline, Ill.) sells for 79¢, includes display stand, full-color decal, insignia and trim, plastic canopy . . . Herb Owbridge (1628 Winona St., Burbank, Cal.) has introduced *MotoRuder*, a double-ended escapement, for $12.50. Replaces *Rudevator*, combines rudder, engine control, giving selection of engine speeds for altitude control.

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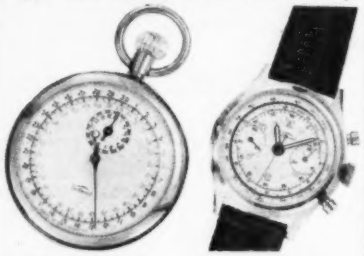

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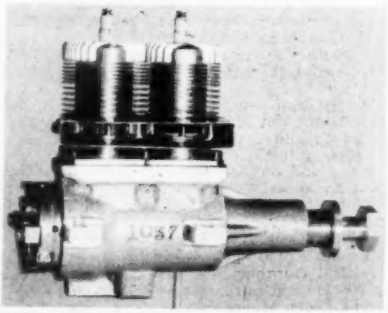

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Report from West

(*Continued from page 4*)

Castro 13.20.4; A Class—1st, Bill Gunther 14.30; B Class—1st, Tom Moore 13.46.1; C Class—1st, Gail Eckstein, 13.20.5.

• • •

Bill Butler, one of the top r.c. men, gave us a rundown on the activities at the Rosecrans Field between Western and Crenshaw. He notes that the AA jobs far outnumber the larger ships in f.f. Each Sunday six or eight r.c. men show up and many fine flights are turned in. Harold Bonner leads the field with his Citizen Band MacNabb receiver in a modified *Rudder Bug*. In addition to perfect rudder control he has worked out a very satisfactory engine speed control on his Arden .19. Bonner has also been flying a *Super Brigadier* with an Arden .099 engine and carrying the MacNabb Citizen Band receiver. His flights with this ship and equipment have been second to none. Colby Evett, W61JX, has a new *Mercury* job with an Arden .19 for power and carries his own radio equipment. Wayne Schindler seems to be the daredevil of the r.c. gang. Wayne has a habit of appearing at the field with a new ship almost every Sunday. He proceeds to fly them high, wide, and handsome, but usually goes home for repairs.

• • •

The Medford (Oregon) Prop Nuts had planned a combination U-control and f.f. meet but weather conditions fouled up the details on the first attempt. A week later the f.f. contestants braved the weather once again only to have it cloud up and storm all over the place. Guess the name "Web Feet" is not all nickname as the lads did wonderfully well combating the adverse conditions. Bob Ottoman's AA staggered up through the rain and wind with a heavy PAA load of rain water on the wing and stab; however, his *Flat Top* 56 with an Arden .19 for power took the weather in stride and turned in flights averaging over 2:40. Don Burgess, a fifteen year old lad, had an AA job that had an original fuselage, *Civy Boy 31* wing, and a *Mini Hogan* stabilizer. Ed Gilkey has built two free-flight originals of the *Phoenix* type, one powered by a McCoy 29 and the other by a McCoy 55. These two ships have been doing wonderfully well. Lloyd Crowell, President of the Medford Prop Nuts, has just completed a *Lil Duper Zilch* and has done a mighty swell job on the finish work; he has also just completed a 36" f.f. job that is similar to the *Flat Top* design of Bob Ottoman.

Lew Miles and his two young sons have been flying A and B class *Zeeks* and have also taken a hand at building some very classy originals. Eileen Ottoman, Bob's wife, has just finished building a *Powerhouse 64* and a *Little Twister*. Dick Simonson, a U-control flyer, has been flying a *Champion 36* wing and stab on an original fuselage. Ronnie White is an all-around free-flight man, flying *Zeeks, Powerhouses,* C Class originals, and towline gliders.

• • •

The fourth contest of the Northern California Free Flight Council was held at Sacramento, California, February 25th. John Koons of the North Sacramento Free Lancers, was the Contest Director. This was their first contest of 1951, and three others are scheduled for this year. The day was extremely cold, and rain threatened the meet in the early hours, but after noon, the sun warmed things up and a good many thermals were evident. One-hundred nine entries were counted and outside contestants came from great distances. Third place winner in Class A, Bob Ottoman of Medford, Oregon, drove down Saturday night with his wife to attend this NCFFC contest. High time of the day and Class A was again taken by a S. F. Vulture, Bill Gunther with 14:30. AA was won by Angelo LaCastro of the S. F. Gulls with 13:20.4. Tom Moore of the Elmhurst Prop Busters, was high man in Class B, and Gail Eckstein of the San Leandro Line Twisters walked off with Class C honors with a 13:20.5 time. High time Senior winner of the Rubber event with 10:52 was Hal Roth of San Rafael, and second place was won by Joe Bilgri. Junior winner of the Rubber event

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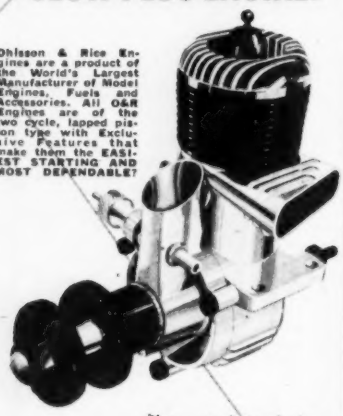

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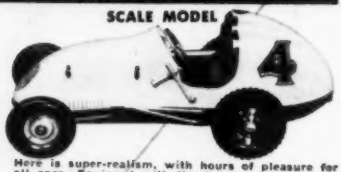

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was Ed Foster of San Jose, with Jack Ritner taking second place.

We would like to congratulate Ocie Randall as Contest Director of the Coast. Ocie has retired as C.D. and will certainly be missed. It is to hard working men like Randall that the model industry owes much of its success. Glad to hear that you are staying with the Fresno Model News, Ocie.

• • •

The Jim Walker "Solo Tournament" Contest is starting to roll in San Diego, and the winner for the first two-week period was young Bobby Ehrhart, fourteen year old enthusiast. Bobby is a novice U-control flyer but has taken to the sport like the proverbial duck to the water. Ehrhart won a beautiful trophy, an Ohlsson 23 engine, and a *Fireball* kit for his efforts. The lad is trying hard to win the trip to the A. J. Aircraft plant in Portland, Oregon, and it looks from here that he will have to stay in there and "pitch" to win as many other young flyers are out to beat him if possible. As we told you before, this contest is open to any U-control flyer in San Diego County, and the one who turns in the greatest number of flight cards for teaching newcomers to control line how to fly, wins very fine bi-weekly prizes as well as a shot at the big prize at the end of the contest. Any type of U-control plane and power plant is permitted for instruction use.

Rubber Round-Up

(*Continued from page* 11)

these same characteristics do not necessarily hold true because we are dealing with low speed aerodynamics, about which there is very little accurate data. The best way to determine whether an airfoil meets your particular requirements is to use it. Choose an airfoil that has been used previously with success and you won't go wrong, but don't be afraid to try something new just because no one else has tried it.

When a designer actually draws out the planform of a wing, he has the choice of a long slender wing (high aspect ratio) or a short wide wing similar to the wing on a Cub (low aspect ratio). Which is the best to use? Experience seems to dictate that the higher aspect ratios from 8-1 on up are best. This means then that a rectangular wing with a 4" chord and a span of 32" will have an a/r of 8-1. In dealing with a tapered wing, find the average chord and divide it into the span and you will have the a/r. A high aspect ratio is particularly desirable when we have a long fuselage because the rolling moment of the model is reduced. This is desirable because the model will be less critical (spirally unstable). A high aspect ratio is also desirable because the wing tips are small and there is less "air spill" at the end of the wing. Therefore the wing is more efficient.

Generally from a construction standpoint and also efficiency, an aspect ratio of between 9 and 12 to 1 is best. The author has found that about 10 to 1 is very good, and a standard wing planform has been evolved using this aspect ratio. Tapering the wings also helps to reduce "air spill" at the tips, but don't have the tip tapered more than 50% of the root chord or considerable loss of lift will result. This is due to the fact that when airfoils are reduced to about 3" in chord, they lose their characteristics and become more like a flat plate section with a resultant loss of efficiency. It is advisable to use a thinner rib on the very tip of the wing so that it will stall last, and the wing tips will still be flying even when the rest of the wing is stalled out. Rounding the wing tips on a rectangular wing will also help reduce tip losses, and a rather bluntly rounded tip on tapered wings will serve the same purpose.

The next point to consider is the dihedral. We have a variety of types to use. All are effective, but some are more effective than others with less loss of lift. Polyhedral is widely used in this country in many forms. A polyhedral wing is most efficient when the over-all span is divided roughly into quarters, (in a 48" wing, each panel wild be 12"). The tips are then raised about 1-1/4" for each foot of span or in this case 5" under each tip. The inner panels are raised about 1/3 of the dihedral under each tip or 1-2/3". In this way the inner panels are relatively flat where the greatest pressure or lift is), and the outboard tips are less effective as far as lift is concerned, but this doesn't matter because there is less lift towards the tips. Polyhedral with its greater dihedral angle under the outboard panels of the wing becomes more effective than straight dihedral.

Tip dihedral (extreme angle at the tip panels, flat center panels) is not too satisfactory because practically all lift is lost at the tips and the center portion does all the lifting.

One point that is generally not understood is the interaction between the amount of wing dihedral and the size of the rudder. Models have been built with very little dihedral (less than 1" rise per foot of span) and huge rudders that are perfectly stable under relatively low power, but under high power the model becomes critical, frequently dutch-rolling or even winding in. The reason of course is that once the model is displaced from its normal line of flight, by a wind gust or strong thermal, the dihedral isn't sufficient to roll the model back to normal flight, and the rudder (becoming more effective at higher speeds) actually winds the model in. The cure would be to increase the dihedral and to decrease the rudder area.

Generally a rubber model with sufficient dihedral (as explained previously) will not be very critical on rudder area, although rubber is just the opposite from gas in that a small rudder will be unstable where a large rudder will not. The rudders effect on stability will be explained more fully in the discussion of the tail assembly.

The fuselage of a rubber model or that of any model actually contributes nothing to the lift as the wing or tail does. Yet by proper layout it can be an important factor in the stability of the model. One prominent builder, Ray Acord, stated that the fuselage of a model is "just something to hold the wing and tail together." In a sense this is true, but the fuselage can and does, when designed correctly, become an important factor in the over-all performance of the model. The fuselage of a rubber model is different from that of a gas model in that it has to be designed with a certain amount of cross section, dependent on the over-all length of the fuselage. This rule is stated as the over-all length of the fuselage (from prop bearing to the end of the tail) squared, divided by 100. For example the required cross section of a 40" fuselage would be found by 40x40/100 equals 16 sq. in. This cross section is determined by the depth of the fuselage times the width, not the over-all sum of the four sides. It can readily be seen then that a fuselage 40" long would have to be 8" deep and 2" wide to meet this rule or any combination that will equal 16 sq. in. This is a handicap that has to be overcome. It is possible that the new AMA rules will be relaxed somewhat, as the Wakefield rules have been, but a minimum cross section is still required in the Wakefield and probably the AMA rules will be similar.

The problem of course is to minimize as much as possible the drag that this cross secton presents. The drag doesn't come so much from the fact that the model is literally pushing the cross section through the air because this can be reduced to practically nothing by having a clean design, but the drag comes from the large surface areas of the fuselage, and this is known as parasitic or skin drag. This is the drag that, at the low speeds rubber models fly, literally holds the model back in the climb and causes a high rate of sink in the glide.

The first solution to this problem that comes to mind is to use a fuselage as short as possible so that the cross section is reduced and the skin areas are thereby reduced. For example, in a 30" fuselage the cross section would only be 9", or 7" less than the 40" fuselage. However, if we do this, say in a Wakefield size model (200 sq. in. wing), we have a fuselage so short that the length of the rubber motor for proper balance is cut down to only 22"or 23". Not only that but the tail moment arm (measured from midpoint of the wing to the midpoint of the stabilizer on c/l of fuselage) is so short that the stabilizer is not effective.

The length of the tail moment arm is probably the most vital factor influencing the

longitudinal stability of the model. This is because the longer the tail moment arm is, the more effective the stabilizer becomes, and the shorter it is, the less effect the stabilizer has in dampening out stalls or dives. To state a rather general rule: when using a wing with between 9 and 10 to 1 aspect ratio the t. m. a. should be about 43% of the wing span (S). When using an aspect ratio under 9 to 1 increase the t. m. a. to about 45% and when using over 11 to 1 aspect ratio decrease it to about 40%. For example in a 39" or 40" fuselage the t. m. a. will be about 21". This is a good compromise between a very long t. m. a. (too much weight in fuselage aft of the wing) and a very short one (too critical in longitudinal balance). The length of the nose moment arm measured from midpoint of the wing on c/l of fuselage to prop bearing, should be about 75% of the t. m. a. For example where the t. m. a. is 21" the n. m. a. will be about 16". This is a good compromise between a very short nose (clay will have to be added to keep c. g. correct) and a very long nose (too much leverage resulting in instability). Now you can see about what the over-all length of the fuselage will be: 16" for n. m. a. plus 21" for t. m. a. plus about 2" or so aft of the midpoint of the stabilizer or about 39" over-all length.

We now come back to the problem of how to reduce skin drag, since it is obvious that we need a long fuselage for proper balance and stability and to allow the use of a long rubber motor. The longer the rubber motor is, the longer the prop will turn, and greater altitude will result. By using blisters beyond the normal fuselage line (see figure) for housing the wing and the landing gear, we get the required cross section and still keep the basic outline of the fuselage small and the parasitic drag is kept down. We also clean up the wing juncture eliminating that drag and also clean up the landing gear (which will be discussed later).

The blisters or bumps may look odd to the designer, but remember contests are won on performance not on good looks. The author has carried out experiments in Wakefield types using the same wing, stabilizer, rubber and prop and force arrangement, but changed the fuselage outline. The slimmed out fuselage with blisters definitely had less drag and resulting times were higher than with a more conventional fuselage.

(To be continued)

Scrap Box

(Continued from page 5)

ber would determine the best all-around men. One drawback is the unexpected admission by Britain that her small diesels are too hard to start. Put glo plugs in them, Johnny Bull!

Harry Williamson's timely article in the April issue of *MAN*, "Payload Comes to Controline," is another dilly of a topic. Duke Fox, the engine man, unknowingly had been carrying on similar development work. Here is his story.

"I like the idea very much," says Duke. "For the past year I have given the subject considerable thought and have performed several experiments. First, a little thought and careful construction pays off. Second, a contest of this type is easily judged and results are decisive. Third, it provides good spectator interest. These are good contest ingredients.

"I would propose the contest to be based on the formula $\frac{\text{Weight X Speed Squared.}}{\text{Displacement}}$ Models would be required to take off unassisted and fly the required laps for official time. After, the flight officials check the weight. Permit the contestant to choose whatever amount of weight he thinks he can get off with.

"I have loaded a .35 equipped stunt model with over five pounds payload (total eight pounds), took off successfully and flew about 60 mph. Even did wingovers—but did it grunt on the pull out! I believe a specially designed model probably could lift about 15 pounds and fly at 50 mph. That would be an accomplishment to be proud of."

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by BILL WINTER

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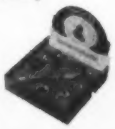

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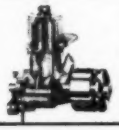

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(*Continued from page* 35)

to the elevator after covering. We will discuss at length the dethermilizer in the flight instructions which follow the instructions on building the wing.

Building the Wing. The wing is known as a single surface wing in a structural sense. It is perhaps the simplest type of wing and highly efficient in flight. The most important part of a wing of this type is the form upon which it is built. Carve a block of pine shaped to the contour of the lower camber of the airfoil or cut two or three ribs of 1/4" plywood to the same shape. Space far enough apart so as to be long enough to build the entire half of the wing and pin to a flat board. Apply glue on the surface of each rib and cover with a stiff cardboard. Now that the form or jig is built we proceed to pin down the leading and trailing edges of the wing. Space correctly so as to insure the proper chord for the wing (width). You will notice at the center of the wing where the two halves are joined a sheet balsa filler of approximately two rib spaces. The sheet filler is built up from 1/16" sheets. Glue one upon the other till the proper thickness is built up. This is built up over the form so that when the glue dries between the laminations, the curve of the airfoil is permanently set and will not tend to flatten out upon the removal of the wing from the form. Repeat the same procedure for the wing tip. We now have a wing which consists of a leading and trailing edge, a center filler and a wing tip.

There remains nothing to do except to install the ribs, which are pre-cut. Place them in their proper positions. Notch them into the leading and trailing edge and glue. When glue has set, remove and sand edge to proper shape. Do the same thing for other half of wing, making sure that this time the tip is on the opposite end of the form, giving us a right and left half panel. Bring the two wing panels together and glue to proper dihedral angle. You will note the drawing requires only 4" dihedral under each wing tip. When covered it will curve up to approximately 5-1/2" dihedral. Cover center joint top and bottom with gauze (bandage cloth), and smear with cement to insure a strong wing.

Flight Instructions. Before we discuss the flying procedure, note in the pictures at beginning of the article, that a flight timer is installed in the ship. The author used the *Spitfire* timer in conjunction with a glow plug. The mounting position is optional and should be selected from the point of view of convenience by the individual builder.

A dethermalizer is used and details can be seen by examination of the drawing. A rather novel innovation has been made with the fuse type dethermalizer, in that the entire tail can be removed from the ship and, upon reassembly to the ship, is keyed into position to insure accurate alignment. For directional control the tab on the rudder is used. In order to add negative or positive incidence to the elevator, wedge a sliver of wood under the metal plate forming the dethermalizer base.

Now with these details out of the way, we can get down to the actual flying of the ship. The wing as noted in the drawing has 2° positive incidence and the elevator is set at 0° to minus 1° incidence. With these settings, it is important to balance the ship at 60% of the wing chord behind the leading edge and in the vertical plane. The center of gravity should be slightly above the line of thrust. Hand glide the ship and use only the elevator for trimming. Do not under any circumstances change the angle of incidence in the wing or move the center of gravity from its afore-mentioned position. When the glide is acceptable, set the rudder tab so that from a hand glide the ship will tend to turn to the right ever so slightly. Approximately 1° of left thrust can be added to the engine so that the ship will climb under power to the left, and glide to the right.

The propeller is the governing factor in determining the amount of side thrust required. Therefore the exact amount of side thrust must be determined by the builder

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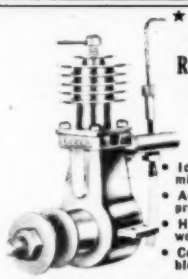

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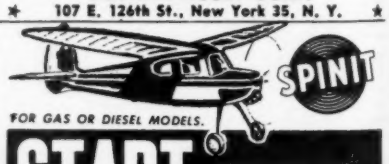

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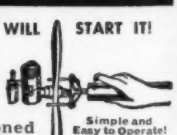

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with respect to the propeller he finds most efficient.

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Rumpler D-1

(*Continued from page 23*)

about 26,000', so the Ru. *D.I* was really a high-climbing airplane!

Maneuverability of the Ru. *D.I* at the lower altitudes—up to about 13,000', was excellent, but it simply would not "hold on" during maneuvers above that altitude. At the 18,000 to 20,000 foot mark, at which a majority of air battles towards the end of 1918 were fought, the *D.I* slipped very badly. It actually lost so much altitude in maneuvering at that altitude as to be virtually worthless. But in straight and level flight, the Ru. *D.I*, could outclimb any other German airplane of the period, in terms of sheer altitude attainable. Thus it can be seen, that while the Ru. *D.I* may have been able to climb to certain altitudes faster than other types, it fell down on its ability to hold its own even with inferior types at high altitudes.

In the lower reaches, it was a perfectly wonderful airplane—it handled well in all respects and was fast besides. But higher up, it began to fall off in detail performance, so much so that it was bested by several other makes in the competition.

General handling characteristics exhibited a lightness on controls all the way through, except, of course, at higher altitudes, where considerable force was required to perform the simplest maneuvers. Controls at high altitudes began to be ineffective, no matter how much force was applied. This led to an over-all pilot fatigue and the psychological aspect of frustration, which the German Imperial Air Service could not afford, in 1918, to permit in their airplanes.

Because of its clean lines, the Ru. *D.I* was an excellent diver. And to help recovery, Rumpler engineers resorted to an inverted airfoil section in the horizontal tail plane. This also had the effect of creating a slight tail-heaviness. The *D.I* had a fast glide because it was so clean, and landed a shade over 60 mph. It stalled out nicely at low altitudes, but rather abruptly above, say, 15,000 feet. The latter characteristic was attributed to placement of the radiators in the lower wing roots, which were supposed to have disturbed the air flow around the tail surfaces and reduced their effectiveness.

If this description of the Ru. *D.I's* flight characteristics gives the impression that it was an entirely inferior airplane, remember this performance was only comparative. Actually the Ru. *D.I* was a good, sound, airplane, both structurally and performance-wise.

Ru. D.I Construction. Actually, all things being equal, construction of the Ru. *D.I* was the item that ruled it out of the race for contracts in 1918. This was a most complicated airplane to build, and production time was precious. German officialdom wisely favored the more straightforward designs that required the fewest man-hours to build, yet met the performance requirements.

The Rumpler *D.I's* complicated and time-consuming construction is best illustrated by a study of the fuselage. This member was made up of a series of 14 plywood rings connected by six longitudinal members. The rings were made of various thicknesses of

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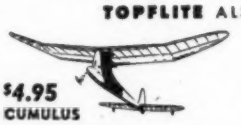
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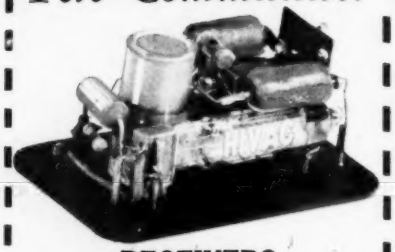

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wood, the heaviest ones in the forward section of the fuselage, supporting the engine bearers, center section struts and landing gear legs. Except for two rings which were reinforced with plywood webs and stiffeners, all were completely cut out.

The six longitudinals were heavier than stringers, but lighter than conventional longerons. They were arranged in right- and left-hand pairs: one pair in line with the fuselage center line; with the other two pairs near the top and bottom contours.

The front and rear thirds of the fuselage were covered with plywood, attached in sheets with tacks, screws and glue. This covering was fastened directly to the body ribs or formers. The center third was reinforced by more than 50 stringers of small cross section, over which was placed a conventional fabric covering. Specific reasons for this peculiar construction are not known, but it can be assumed that an attempt was made to simplify access to the cockpit controls, instruments, etc., which were in the area most likely to receive hits. Maintenance of fabric in this area also would have been much more simple than repair of a plywood skin.

The rearmost fuselage rings (two or three, depending on the rudder shape) were extended upward on top to form spars for the vertical fin. This fin was covered by plywood brought up from the fuselage to form a fixed, built-in unit. The fuselage was finished off in the rear by a metal tail cone which was removable to give access to empennage control cables, pulleys and horns, which it concealed.

Although most of the engine section was located within the plywood covering at the nose, the upper portion of the engine was protected by a sheet metal cowling. The nose was finished off in a large formed aluminum sheet nosepiece. No spinner was fitted on the *D.I* propeller, presumably for production or weight reasons. This seemed to be inconsistent with the design thinking displayed in the basic airframe.

The engine was mounted on ash bearers which in turn were supported by a box structure made of cut-out plywood sheets reinforced by stringers. Similar plywood box structures supported the main fuel tank, cockpit floorboard and pilot's seat.

The main fuel tank was located immediately behind the engine and had a capacity of 80 l. It operated under pressure provided by an air pump driven by the engine. Above it was a reserve tank of 25 l., also operating under air pressure. The oil tank, of 10 l. capacity, was at the rear of the engine at the bottom. An additional 5 l. of oil were contained in the engine crankcase.

The pilot sat with his toes and rudder bar under the rear of the main fuel tank. An air pressure regulating valve was attached to the tank within easy reach. The pressure gauge was located above the tank, on the outside of the fuselage. The engine tachometer was located just in front of the windshield, connected directly to the engine camshaft by a flexible cable.

Other instruments and controls were situated within the cockpit and included an air speed indicator, altimeter, ball turn indicator, compass and clock; fuel shut-off valve, and magneto switch. Instruments and controls were attached to convenient structure—there was no instrument panel.

Armament of the Ru. *D.I* consisted of two Spandau machine guns located in front of the pilot atop the fuselage. Ammo belt trays were easily accessible from inside the cockpit.

Landing gear was a conventional steel-tube strut affair with a one-piece axle. Spiral coil springs were used to absorb shock. The tail skid was of wood with a metal shoe, and was attached to the tail former. It was sprung internally on a steel spring.

Overall length of the fuselage was given as 5.75 m. with a landing gear tread of 1.69 m. The fuselage weighed 89.5 kg., accessories 19 kg., landing gear and tail skit 53.2 kg. The engine, dry and less piping weighed 290 kg., muffler and exhaust collector, fuel and oil tanks, 5 kg., propeller including bolts, 19 kg., and internal cockpit equipment, 10.2 kg.

Flight Surfaces. Wings of the Ru. *D.I* were as simple in construction as the fuselage was complicated. A number of design innovations

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were incorporated that provided planes of very high strength to weight ratio. The upper wing was manufactured in two pieces, then permanently joined before covering. Two spars of I beam section were used. The front spar doubled for the leading edge, while the rear spar was placed at about 50% chord.

Spars were connected by eight steel tube compression members, and were internally braced with steel wire. Ribs were of two types, both webbed and built-up. In either case plywood was the material used between the top and bottom capstrips, with vertical stiffeners placed at strain points. The leading edge was reinforced by a spanwise piece of plywood formed to fit around the front spar. Ribs were closely enough spaced to eliminate the need for false ribs. Ailerons were located only in the upper wing, and both balanced and non-balanced types were used. They were hinged to a false spar which served no other purpose. The trailing edge was steel wire in some instances, wood strip in others.

The lower wing followed the same general construction practice.

The upper wing was attached to the fuselage by outward splayed *N* struts; the lower wings were butted to short stubs which were nicely faired into the fuselage. Interplane struts were a peculiar C shape.

Empennage of the Ru. *D.I* was entirely conventional. Both horizontal and vertical stabilizers were built into the fuselage. The horizontal stabilizer was covered with plywood, after assembly. Elevators were unbalanced. Although the accompanying illustrations do not show it, the last model Ru. *D-I's* vertical tail surfaces were triangular in shape. The rudder was unbalanced in contrast to one of the two previous rudders, which were generously rounded.

The empennage was entirely framed in wood, and carried a heavy airfoil section—symmetrical for vertical members, and inverted for the horizontal members.

Rigging. In an attempt to squeeze every possible ounce of performance out of the Ru. *D.I*, its designers meticulously rigged the airplane. The lower wing, for instance, was swept back 30 min., and was given 2-1/2° dihedral in some instances. Incidence of the lower wing was 4° at the fuselage, washing out to 2-1/2° at the interplane strut. The upper wing was without dihedral or sweepback. Its incidence was 3° at the center, and 1/2° at the tips. The horizontal stabilizer was set at 0° incidence.

That, then was the Rumpler *D.I*, born of a dream and dying in the last gasps of a nation defeated in war. Had production facilities been available, the *D.I* might have plied the war skies of 1918 in great numbers. It will, however, remain always a tribute to German engineering genius.

Angle on Climb

(*Continued from page* 20)

power to 6° angle of attack and you will obtail more lift than you know what to do with. For an 8 oz. model, the lift might be as high as 18 oz.

Starting with this assumption, a high-lift force was placed in the force diagram. (Check with diagram No. 1 as we go along.) It would seem that, although the model could be flying along the *T* flight line, it might want to move in the direction of the 11.5 resultant. Here we have two forces, thrust of 8 oz. and lift of 8 oz. Their resultant is in the direction shown with a value of 11.5 oz. —more than needed to counteract 9 oz. of weight. This meant that the airflow would tend to come from this resultant direction. Perhaps not exactly along the line but somewhere between the lines of thrust and lift. This would mean that the angle of attack of the model would be negative. We wondered at that time if it was possible that the stabilizer would not have a negative load with which to nose the model upward. Once the nose started to move upward, it would take no time to develop a loop with a c.g. at 25°.

Much later, after we had a serious correspondence with Hewitt Phillips of the *NACA*, pitching moment calculations were worked

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out. It was found that if a model was trimmed or balanced to glide at 6° angle of attack, any tendency that would bring the ship into lower angles would give the wing greater force about the c.g. with which to bring the plane back to balanced condition. (We also worked out a balanced power condition for the c.g., 1/2" in front of the leading edge, and found that, if the model flew at 20 mph it could develop sufficient lift at 0° angle of attack. The download on the stabilizer would be enough to counteract the lift of the wing and point the model upward.) If this seems vague so far, don't let it bother you. The writer suffered enough for all three of us to get the answers, which is what counts.

It took us weeks to work out the exact process by which high power gives so much trouble. Lift calculations were made for many angles. Out of all this came the fact that at high speed we must devise some means of reducing wing lift. As long as the thrust is greater, or same as the weight of the model, we must have very little lift from the wing. As power drops, a bit more lift is needed.

Diagram No. 1 assumes 8 oz. thrust, 8 oz. lift and 8 oz. weight. It is conservative to use only 8 oz. lift, as we know much more develops under power when we trim models for glide. Note what happens: The thrust and lift forces develop an 11.5 oz. resultant. Not only is it 3.5 oz. more than required, but it also points backward. The tendency of the model will be to move in a path somewhere between flight path T and the resultant, or even steeper than the 70° shown. It is obvious that 8 oz. thrust is enough for a vertical climb without any help from the wing. If you have the wing contributing lift, the result could be a loop.

Our solution was to reduce the lift during power flight sufficiently to remove the force which causes looping. (Now see diagram No. 2.) Here we have a balanced condition, with wing producing only 2.5 oz. of lift. The vertical resultant may be a bit more than the required 8 oz., but it is close enough to avoid looping.

When the idea came to us that we have to reduce lift during super-high power climb, the solution was not immediately apparent. Somehow the angle of attack would have to be reduced to lower values than when set for glide. We tried wonderful gadgets that would bring the stabilizer into high angles during the motor run to force the wing into lower angles of low lift. Then, while studying Hewitt's sketches in which he used an example of how to reduce downwash of the wing by using a pylon design, so that prop wash would clear the wing, the solution came with a bang. Why not use prop wash to slam at a highly angled stabilizer, and so make it lift more about the c.g. than the wing—only during the power run! By making the stabilizer force stronger, it would force the wing into lower angles of attack, where it would produce lower lift.

For the moment, let us consider the 20° downthrust situation. After going through that c.g. 1/2" in front of leading edge experience, we decided to experiment with down thrust. During the course of the testing the wing was at 10° and the stabilizer at 7°. Ten deg. downthrust was applied, and much to our surprise, the model behaved gently, but it had no pep. Checking the diagram you can see what a 20° downthrust does. It decreases the resultant to 8 oz. and also brings it to a vertical location. With the thrust line at 0°, the situation shown in broken lines prevailed. The reason for the gentle behaviour is that the model was now flying with thrust and lift working against each other. You could say we balanced out the excessive forces. This is a waste of power. The idea is to reduce lift of the wing, and with it reduce drag so that the motor's power is applied effectively for climb.

While on the thrust line subject, can you see how its force about the c.g. has minor importance in contrast to its position in relation to the flight path? We had it 1" above the c.g., and it would not stop looping. But when we used it to counteract excessive lift, we obtained some sort of a control. It undoubtedly tended to bring the entire model into lower angles of attack. But we know that at a lower overall angle of attack the wing has greater force about the c.g. So it was a question, which was stronger, the lift of the wing or the thrust. Until we reached 20° down thrust, the wing was stronger. Incidentally, do not take this down thrust figure seriously; it may work only for this particular design. If you use an 0-0 setting and a c.g. at 100 per cent chord, you get into a different situation.

We must admit that we slipped up a bit in making the model. Until we started to draw up the ship, we were under the impression that we had the wing at 10° and stabilizer at 7° to the base line. Now we find it at 0-0.

We planned to use maximum amount of stabilizer angle on which to blast the prop wash. Eeven deg. or, we now say, 10° looked good. And 10° between wing and thrust line did not look too bad. We would have some help from thrust in bringing the wing to lower angles or reducing its lift values. The glide was good without corrections. The power flight was as described in the opening paragraph. While working on the new year book, we made an extensive study of high climb under power, and worked up the force diagram shown. The No. 2 diagram shows that only 2.5 oz. lift developed during power flight. Using full scale facts and a speed of 20 mph we found that the wing will develop 2.5 oz. when flying at —3°.

This diagram also shows how the prop blast forced the wing to operate at —3° where it develops just enough lift to produce a stable condition. For all we know, the model may have moved at 20 mph along the 70° climb. This would mean a 1500' per min. climb. During flights, we actually notice the model going up straight and drifting back in a horizontal direction.

Seriously speaking, this idea of reducing lift at high speed has possibilities. In fact, it may be the only way to make models safer! You would be surprised how many other troubles could be eliminated. We know because we had fun making models smash up in our calculations.

Turn troubles? Well, we tried to put it into a right turn glide and found that our model would make a sort of a vertical Z and reverse U power dive. It took a few broken props to realize that we were flying a vertical path. A turn adjustment would mean a vertical circle.

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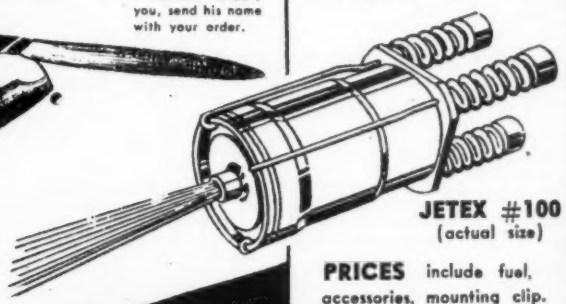

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ACE "English MG" KIT No. 8R

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(Some would call it half loop, except that this model was loop proofed.) We simply had too high a climb angle to apply any ordinary turn adjustments. Of course, we could have used side thrust to offset rudder setting, or automatic rudder adjustments when power cut, or play with rudder areas and so on. But the object of the test was to develop a safe method of obtaining high power climb.

The original model was intended for a .045 Cub. We substituted .09 Cub, feeling that if the model was capable of handling high power, this was a good way to find out. It did.

There is a great deal more to high-power flying, and why some of the present day designs can handle power, although rather touchy on control. If you expect to try our idea, do not adjust for tight glide turns or you will have trouble unless compensating adjustments are made on the power flight. Give it a try; you can't lose more than a prop a flight.

News of Modelers

PEN-PAL SEEKERS: Noel Anderson, Whenuapai, R. D. Kumeu, North Auckland, New Zealand would like to correspond with someone interested in all types of flying and scale models.

EXCHANGE MOTORS: Pat Mulroney, 6 Onslow St., Soutn Perth, Western Australia and Rod Wishart, 15 Leichardt St., Victoria Park, Western Australia would like to exchange English and Australian diesels for American glo-plug motors . . . Pete F. Muller, 4 Bromar Rd., London, S. E. 5, England would like to exchange motors, plans and books with an American modeler.

SPECIAL REQUESTS: G. D. Louw, 103 MacWilliam St., Venterspost, Transvaal, South Africa wants full-size plans of flying scale models of twin-engined and four-engined transports and war planes suitable for radio control . . . L. W. Patterson, 134 Russell St., Gisborne, North Island, New Zealand would like to exchange several English annuals for *Air Age Gas Models* and other American publications.

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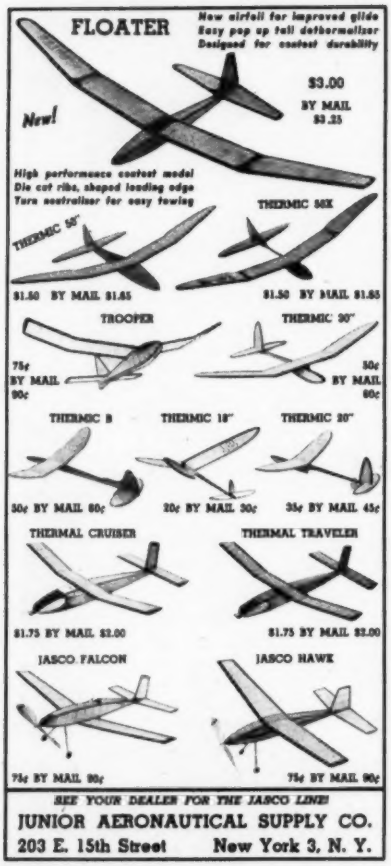

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1/16x3/16	1½c	1/4x1/2	6c	1/20x2	10c
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1/16x3/8	2½c	1/4x3/4	8c	3/32x2	12c
1/16x1/2	3c	3/16 sq.	5c	1/8x3	15c
3/32 sq.	1¢	3/8 sq.	6c	5/32x2	13c
3/32x3/16	2c	3/8x1/2	8c	3/16x2	14c
3/32x1/4	2½c	1/2 sq.	8c	1/4x3	25c
3/32x3/8	3c	3/4 sq.	15c	5/16x2	18c
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1/8 sq. 3 for	5c	1x3	$ .65	1/2x2	22c
1/8x1/4	2½c	1x6	$1.20	1/32x3	14c
1/8x3/8	3c	2x2	.85	1/16x3	14c
1/8x1/2	4c	2x4	1.60	3/32x3	18c
5/32 sq.	1½c	2x6	2.35	1/8x3	22c
3/16 sq.	2c	3x3	1.80	3/16x3	22c
3/16x1/4	3c	3x6	4.00	1/4x3	25c
3/16x3/8	3½c	4x4	3.50	3/8x3	32c
3/16x1/2	5c	4x6	4.25	1/8x3	35c

Beveled balsa trailing edges, 36" lengths

3/32x3/8	4c	3/32x5/8	6c	7/32x3/8	8c
1/8x1/2	5c	3/16x3/4	7c	1/4x1	9c

Propeller Blocks

8x7/8x1-3/16	8c	9x1-1/2x2	18c	18x1-3/4x2	40c
10x1x1-1/2	12c	10x1-3/4x2	25c	Glider Wing Section	
12x1x1-1/2	14c	16x1-1/2x2	32c	3x3/16x20	18c
14x1-3/16x1-3/4	18c				

Comet tube cement ..... 10c & 25c
Tester A or B cement ..... 10c & 25c
Clear Dope ..... 1 oz. 10c, 2 oz. 20c, 8 oz. 60c
Thinner ..... 1 oz. 10c, 2 oz. 20c, 8 oz. 60c
Colored Dope ..... 1 oz. 10c, 2 oz. 20c, 8 oz. 45c
Red, Orange, Yellow, Green, Lt. Blue, Metallic Red, Metallic Blue, Black, White, Silver, Olive Drab
Music wire ..... 3 ft. .020 & .030, 3c; .035 & .040, 4c; 1/16, 5c; 3/32, 10c; 1/8, 15c
Silkspan, White ..... 00, 5c sheet; GM, 10c; 3 for 25c
Jap Tissue, Red, Yellow, Blue ..... 2 for 15c
C-D Tissue, White, Red, Yellow, Blue ..... 10c, 3 for 25c
T-86 rubber, per ft. 1/32, 1/16, 3/32, 1/8, 1c; 3/16, 1½c; 1/4, 2c
Aluminum tubing, per ft. 1/16, 3/32, 10c; 1/8, 12c, 3/16, 15c; 1/4 18c
Brass tubing, per ft. 1/16, 12c; 3/32, 14c; 1/8, 16c; 3/16, 20c; 1/4, 24c
Plywood Sheets 6x12: 1/16; 3/32; 1/8; 3/16; 1/4 30c
Cellulose acetate sheets ..... .005, 10c; .010, 20c; .020; 30c
Tester carved balsa propellers 12", 14" & 16" dia. ..... 50c ea.
Jasco rubber tube ..... 1 oz. 15c
Jasco Microfilm Solution ..... 1 oz. 17c
Prop hook ..... small 5c; med. 5c; large 10c
Large face bushings .3/8"; 7/8", eyelet 1/16x3/16, 5c
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Official AMA News

(Continued from page 32)

words per minute of Morse Code. Technical exam same as Class B. Regulations exam same as Class B; c. Frequencies—All amateur bands above 220 mc. This means 220 to 225 mc, 420 to 450 mc, and others above 1000 mc. 2—Novice—a. Duration—Good for one year, not renewable; b. Exam—5 words per minute of Morse Code. Technical and regulations exam simpler than Class B; c. Frequencies—26.960 to 27.230 mc and 145 to 147. mc. Only A-1 emission (on-off carrier). All transmitters must be crystal controlled.

Note that both of these licenses are simpler than the old Class B which required a 13 words per minute code test. Walt (Radio Control Committee Chairman) Good's guess is that the Novice Class on the 26.960 to 27.23 mc band is the easiest way to get started on radio control. For more serious and more permanent work, try the Technician Class on 220 mc.

For more details, write to the F.C.C. for Amendment of Part 12 "Rules Governing Amateur Radio Service" Docket 9295.

Records Pending. Don C. Sutton, Phoenix, Ariz., has applied for a record of 30 min. for Free Flight Gas Models, Class B. Don's model was a *San Diegan* powered by a K & B *Torpedo 24*. The three 10 min. flights were made at the 1st Annual Southwestern Regionals held March 4th at Phoenix.

Also pending is the record application of Dick Everett's, San Diego, Calif., for a national outdoor unlimited rubber record of 17:14.6. Dick's flights were also made at the Southwestern Regionals. His model, *El Dobo IV*, was an original design of the Waktfield type.

AMA President, Ken Held, has named the proposed advisory committees for this year. Letters of appointment have been mailed to all committee members, but all have not yet acknowledged their acceptance. The committees in which all members have acknowledged their acceptances follow: *Controline Speed Advisory Committee.* Keith H. Storey, Chairman, 737 S. Pasadena Ave., Pasadena 2, Calif.; Harold deBolt, Box 73, Williamsville, New York; Matthew Sullivan, 2078 Simon St., Philadelphia, Pa.; Lew Mahieu, 211 Roosevelt Road, Long Beach 7, Calif.; Arthur Hasselbach, 3087 Third Ave., Bronx 56, N. Y. *Radio Control Advisory Committee.* Walter A. Good, Chairman, 9802 Howard Ave., Bethesda, Md.; John Worth, P. O. Box 9, Hampton, Va.; Richard Schumacher, 6638 Encino Ave., Van Nuys, Calif.; Howard McEntee, 490 Fairfield Ave., Ridgewood, N. J.; Clayton F. Freese, 2019 Grove St., Glenview, Illinois.

Jim McCandless, genial dispenser of publicity for the Plymouth model aviation program, has something up his sleeve but we don't know exactly what. Jim is looking for the largest flying scale model airplane in the United States! We understand there may be some prize in connection with finding this big model, so if you have a "big-un," better get in touch with either James W. McCandless, c/o N. W. Ayer, 4100 Penobscott Bldg., Detroit, Mich., or AMA, 1025 Connecticut Ave., Washington 6, D. C.

Having a Team Racing Meet? Have enough prizes? No? Here's good news for you! Berkeley Models, Inc., has a contest prize fund for Team Racing events which is administered by the AMA. If you're running an AMA sanctioned meet with a Team Racing event, drop AMA a note for contest prizes. We trust you will realize that the size of the prizes will have to be limited due to the number of requests.

Ted Clodius, Contest Manager of the 6th Annual Mirror Model Flying Fair, has provided advanced registration figures for the 1000 entries already received which prove to be quite interesting. They speak for themselves, so we list them here: Radio Control —120 entries; Navy Carrier—158; Beauty—188; Stunt—230; AA CL Speed—236; A—270; B—291; C—175; D—216; Jet—101; AA FF Gas —526; A—419; B—331; C—216; PAA Load —573!

Art Hasselbach will be the over-all director for controline events at the MMFF with men under him to direct the various events. Paul Del Gatto has been named over-all director

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1908 "Old 16" Loco.	3.95
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of free flight and radio control events. Lt. John H. Burton, USN, and George Gardner, PAA Educational Director, will be in charge of setting up Navy and PAA event directors.

The handicap system for the 6th MMFF has been altered to a more equitable basis. Handicaps will be figured according to the contestant's contest record during the past two years for speed and stunt events. Those having won one or two third or higher places in controline speed will be handicapped 2 mph; three or more wins—5 mph. Those having won one or two third or higher places in stunt will be handicapped 20 points; three or more wins—50 points.

AMA Sanctioned Contests

May

6—Millville, N. J. Season Opening Record Trials for CL, FFG, and OR. Charles Errickson, Contest Director, 31 Walnut St., Bridgeton, N. J.

6—Fontana, Calif. Hi Tailers' Ist Annual AA PAA Load Contest. Pending.

6—Medford, Ore. Class AA Medford Prop Nuts' Free Flight Contest. FFG, TLG, OR, and Jetex events are scheduled. Edgar H. Sims, C.D., 23 North Fir, Medford, Ore. Pending.

6—Schenectady, N. Y. Schenectady Aeroneers Rubber Record Trials. George Fowler, C.D., 93 East Side Dr., Balston Lake, N. Y.

20—Class AAA Wakefield Eliminations in Mid-Western and Eastern areas. Write to nearest Wakefield Committee Member for information: Ed Lidgard, 814 Bryan St., South Bend, Ind.; Bill Fletcher, 8708 Grand Ave., Elmhurst, L. I., N. Y.

20—Shelby, O. Class A Shelby Balsa Buzzards' Hobo Meet for FFG. Entry is restricted to residents of the northern half of Ohio. H. L. Robinson, C.D., Shelby Pure Milk Co., Shelby, O.

20—Greensboro, N. C. Prop-Twisters' First Bi-Annual Record Trials for CL. W. H. Bunting, C. D., 119 N. Greene St., Greensboro, N. C.

20—Yonkers, N. Y. Exchange Club of Yonkers Annual Model Aviation Meet. Pending.

27—Quakertown, Pa. Class A Second Bucks County Federation of Model Airplane Clubs Team Race Meet. Entry is restricted to residents of Pa., N. Y., N. J., Md., and Del. Wm. Pitt Hartzell, C.D., 335 Juniper St., Quakertown, Pa.

June

3—Bethpage, L. I., N. Y. Class AAA Ltd. 6th Annual Mirror Model Flying Fair. Events: CL, Navy Carrier, CLS, FFG, PAA Load, RC, and CL Beauty. Ted Clodius, Contest Manager, 235 East 45th St., New York 17, N. Y.

3—Minneapolis & St. Paul, Minn. Class AAA 2nd Annual Talent Scout Contest. Events are CL, CLS, FFG, OR, and TLG. Flyers must be under 17 years of age; talent scout—over 17. Paul J. Ring, C.D., 2816 E. 42nd St., Minneapolis 6, Minn.

16 & 17—Atlanta, Ga. Class AAA Southeastern Model Air Meet for HLG, TLG, OR, FFG, CL, CLS, and CLFS. Fred G. Turner, Jr., C.D., 3284 Stillwood Dr., Hapeville, Ga. Pending.

17—New York, N. Y. Class AAA Long Island Gas Monkeys' Championships. FFG and PAA Load events are scheduled. Ernest Roff, C.D., 56 Stuart Ave., Malverne, N. Y.

24—Schenectady, N. Y. Class AA Schenectady Aeroneers' Annual Meet for FFG, OR, TLG, and HLG. George Fowler, C.D., 93 East Side Dr., Balston Lake, N. Y.

30—Detroit, Mich. Class AAA Michigan State Exchange Club Contest for OR, FFG, CL, CLS, PAA Load, and RC. Entry is restricted to residents of Michigan. Frank P. Sposite, C.D., 9900 E. Jefferson, Detroit, Mich. This is a two-day meet. Second day is July 1.

July

1—Shelby, O. Class AA Shelby Balsa Buzzards' 6th Annual Meet for FFG and OR. H. L. Robinson, C.D., Shelby Pure Milk Co., Shelby, O.

8—Manchester, Conn. Class A Connecticut Stunt and Scale Meet for control line models. Entry is restricted to residents of Conn. George Fitzgerald, C.D., 83½ Chanter Oak St., Manchester, Conn. Pending.

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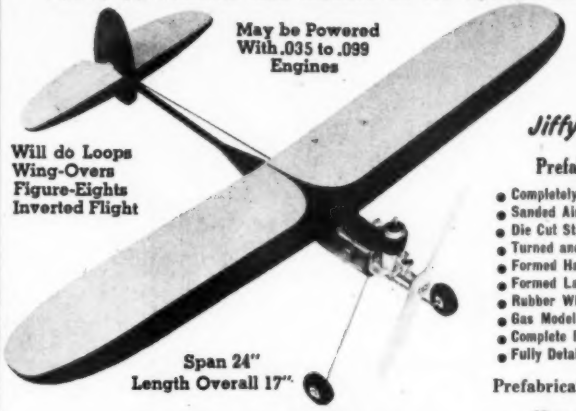

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- Fully Detailed Plans and Instructions.

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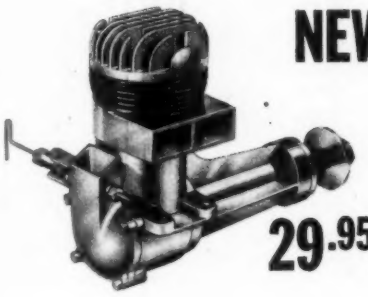

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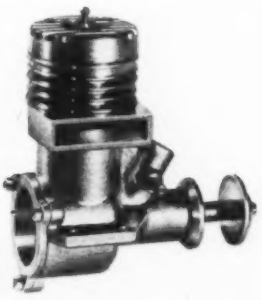

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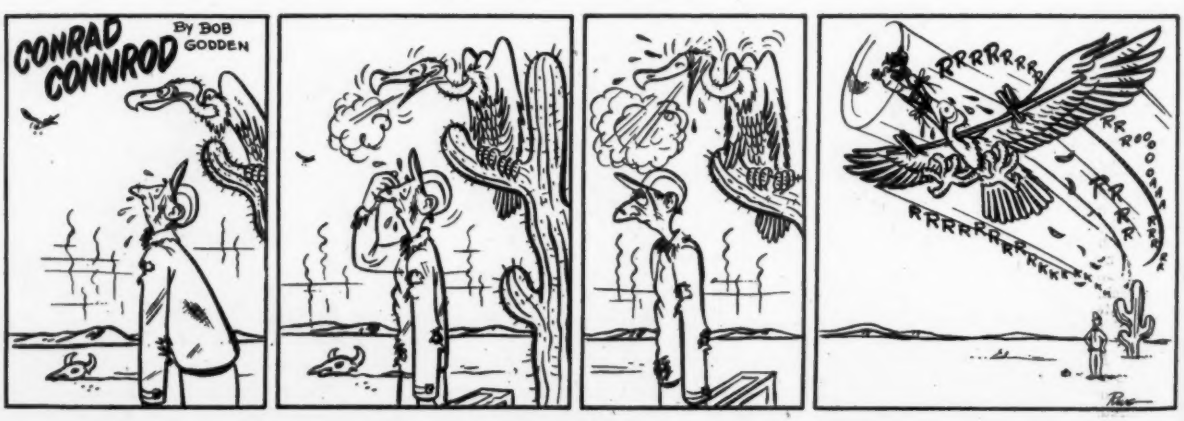


15—Cleveland, O. Class AA 4th Annual AA Contest for FFG. John W. Grega, C.D., 10422 Gay Ave., Cleveland, O.
22—Falls Church, Va. Pending.
23-29—Dallas, Texas. National Model Airplane Championships.

August
5—Minneapolis, Minn. PAA Load Contest. Pending.
19—Hicksville, L. I., N. Y. Class AA Long Island Invitational AA Championships. All AA Free flight events are scheduled including ROW, Flying Scale, and Clipper Cargo. William Johnke, C.D., 601 Meadowbrook Rd., Uniondale, Hempstead, N. Y.
22-27—Detroit, Mich. Class AAAA Ltd. Fifth International Model Plane Contest. Tentatively scheduled events are OR, OHLG, FFG, CL, CLS, CLFS, TR, Navy Carrier, and Combat. See your Plymouth Dealer for information.

September
2 & 3—Pawtucket, R. I. Class AAA All New England Model Meet for CL, CLS, CLFS, TR, FFG, and OR. Arthur Bergeron, C.D., 55 Ricard St., Seekonk, Mass.
3—Far Hills, N. J. Pending.
9—New Britain, Conn. Class AAA Connecticut State Championships for CLS, CLFS, and CL. Richard Matava and Michael Adajian, C.D's., 358 Prospect St., Hartford, Conn.

Key to listing of events: FFG—Free Flight Gas; CL—Controline Speed; OR—Outdoor Rubber; TLG — Towline Glider; OHLG — Outdoor Hand-Launched Glider; CLS—Controline Precision (Stunt); CLFS—Controline Flying Scale; RC—Radio Control; TR—Team Racing.

Contests designated "Pending" mean the application is before the proper authorities as we go to press; "Record Trials" mean no prizes, but a chance at cracking the records; "Class A" is a meet with restricted entry; "Class AA" is a meet with unrestricted entry; "Class AAA" is a state-wide or regional meet; "Class AAAA" is a national or international meet.

Planes in the News

(*Continued from page* 13)

the thinking that produced the Bell *X-1* which, as you'll remember, has a straight wing, conventional tail surfaces and a rocket engine. The *X-4* has a swept-back wing, no tail and a pair of turbojets. Lateral and longitudinal control are handled by the Northrop elevon set-up which combines the functions of ailerons and elevators in a single set of surfaces. Basic design of the plane stems from aerodynamic theories of several years ago. At that time the general impression was that only a swept-back wing would permit easy transonic flight and that a conventional horizontal tail was a big trouble-maker in the same speed range. (Since then, the picture has changed. Aerodynamicists have found that a thin wing also permits easy transonic flight and that tail troubles can be licked by all-movable and boosted surfaces, and correct tail locations.)

Anyway, the *X-4* is a perky little airplane, and a very ingenious solution to a very tough problem. There aren't any ribs. A series of wing beams supply strength and form. Only a single diagonal member, from the leading edge to trailing edge near the flap-elevon juncture, breaks the pure spanwise structure.

Fuel—239 gals. of it—is sandwiched into the *X-4* in two cells behind the pilot and in three cells in each wing. A unique feature is the unbraced *Plexiglas* canopy, different from any other high-speed canopy in service today.

The *X-4* has a 25' wingspan, is 20' long and about 15' high. Gross weight is 7000 lb. Two Westinghouse *J-30* engines, of 1600 lb. static thrust each, power the ship. It is painted a glossy white with black markings and standard USAF insignia. First flight was on Dec. 15, 1948.

Vought F7U series has been one of the mysteries of the past few years. At the time Vought moved to Dallas, publicity on the *F7U* ceased, and the plane was almost forgotten. But two things happened recently which tip-off the future for this unconventional craft. First, there was a company release of the announcement of a new contract for Cutlass production. And second, there was the release of the new photo shown here. New production version, says Vought, is to be designated *F7U-3*, and powered with the new Westinghouse *J-46* engines, rated at about 6000 lb. each with afterburners.

In the original of a released photo, the plane designation can just be made out, and it is *F7U-1*, not -3. But don't let this confuse you. Picture is probably of the pre-production prototype, or of an earlier *F7U-1* with the -3 modifications. Look at the vertical tail, which is a lot bigger and taller than it used to be. And the outlines of the engine packages have changed, also. So chances are the production *F7U-3* is going to look like the one shown in the picture.

How fast? Navy isn't saying. But the prototype *F7-1* was unofficially credited with a top speed of better than 650 mph. And all that's been done is to about double the thrust for the -3. Supersonic? Probably not, but not far from it. And just think of the rate of climb.

Atoms and Airplanes have been married again in the headlines, with such statements as "eighty times around the world on a pound of fuel." And all this from the simple announcement that the first phase of the NEPA (Nuclear Energy for the Propulsion of Aircraft) project had been concluded. To keep you up to date, General Electric Co. and the Air Force were ironing out the wrinkles at press time and expected to make a joint announcement soon.

In spite of your paper, don't think that this is the airplane of tomorrow—or even the next day. There are so many design problems which have to be solved, and so many allied sciences and industries which must be brought up to date on nuclear power, that the atom-powered plane appears to be about ten years off. Remember that the *B-36* was about a ten-year job from ideas to service, and that it was a conventional aircraft with techniques which were extrapolations of standard practice. With atomic aircraft, we have no experience and not much data to start with. This is a big bite, and it's going to be tough to chew.

Hiller Hornet is the latest development of Stanley Hiller's West coast rotary-wing firm. The *Hornet* was originally dreamed up as a poor-man's helicopter to sell for less than $5000. But Korea and allocations put a crimp in that idea, and anyway Hiller's factory is busy 100% with military production of the 360 *Hillercopter*.

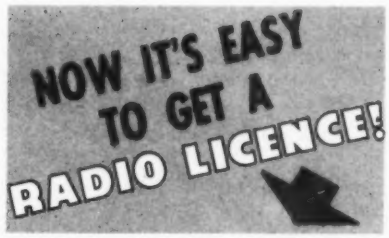
Hornet is powered by two ramjet engines, one on each rotor tip. The engines are only about 7" diameter, weigh 11 lb. and deliver 31 lb. of thrust each. They can be changed in about three min. using only a screwdriver. A two-cylinder gasoline engine, like those which power lawnmowers, is used to get things rolling. When the rotors are up to about 150 rpm, the ramjet engines are ignited and the starter system cut out.

Gross weight of the Hornet is 900 lb., of which 340 lb. is empty weight. Rotor diameter is 27', height 7'.

Initial rate of climb is 100 fpm; service ceiling is 12,000'. It cruises at 70 mph and carries 37 gal. of fuel.

More on the MIG. Performance has been summarized in *Aviation Week* by its Korean observer A. W. Jessup. His figures, first to have any stamp of authenticity, make it appear pretty certain that MIGs have been shot down and dissected by our Air Force. For example, wing span is given as 32' 6", and length 32' 9". This is not measured while flying by in an *F-86*. Top speed is rated at well above 690 mph. It climbs at 8000 fpm from the deck, and at 30,000' is still boring upward at 4000 fpm. According to a German correspondent of mine, the MIGs over Germany are all equipped with afterburners, and the Russian pilots use them as a matter of routine during training missions for accelerated climb and breakaway. The same source says that the Reds are apparently poor bad-weather pilots; comes rain or heavy weather, the MIGs stay on the ground.

The French can turn out some of the slickest aircraft seen by the eyes of man, with



The new Novice Class Amateur Radio License will be available July 1, 1951. A very simple written test on radio fundamentals and a code test of only 5 words a minute—less than 40% of the former requirements, is all that is required to obtain your license. Building your own Aerotrol Radio Control gives you the fundamentals.

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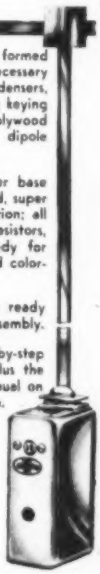

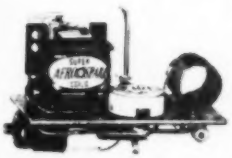

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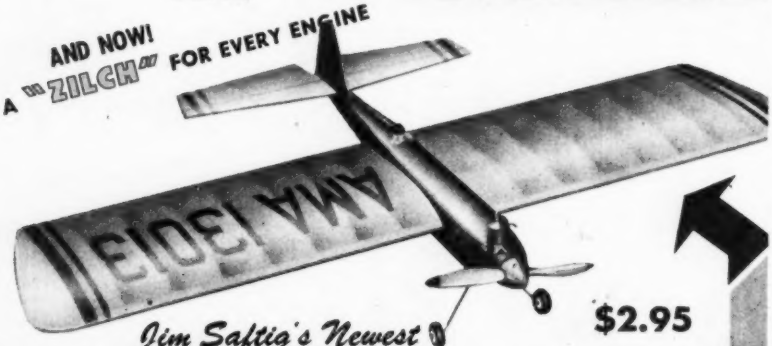

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poetic lines and inherent ruggedness. And they can also turn out some of the most frightful looking beasts of the air that you could imagine. Let's look at one of the weird ones—the *SE 2410 Grognard*.

This plane flew over a year ago, but the French Air Ministry has just recently seen fit to release photographs. Grognard is a twin-jet attack plane with the outstanding feature being that the engines are mounted in sort of an over-and-under arrangement.

The craft has a swept-back, mid-mounted wing and swept tail, the latter having variable incidence. So from the top, *Grognard* is the epitome of current-day convention. But from the side, there are lumps and bulges. The cabin lines are fairly clean, and just above and behind the cabin there is a large swelling for the air intake. The fuselage upper line goes about straight aft, breaking into a triangular fin and rectangular rudder. Fuselage belly line goes aft from the cabin in a smooth contour until the tail is neared. Then about below the vertical tail, there is another break serving as a tail bumper. The twin jet exhaust pipes are mounted in an ugly tail cone fairing of a height nearly equal to that of the cabin.

Main and nose wheels retract into the fuselage, and because of this, main gear tread is narrow. Ailerons are quite small, trailing edge flaps large. And drooping nose flaps are also fitted.

Proving that the French are clever designers is the cockpit control system. Instead of the central stick or wheel control column, the ingenious designer built hand grips on each of the two arm rests on the pilot's seat. These grips are interconnected for one-hand flying, have the same degrees of motion as a conventional stick. Two claims result from this novel gear: first, the instrument panel is a lot more visible than when there is a huge stick and control handle in front of it; second, more buttons and switches can be mounted on the two grips than usually possible. A two-seater *Grognard*, the *SE 2415*, is being built, and an all-weather version, *SE 2421*, is to be available later. Only released figure is the gross weight—43,000 lb.

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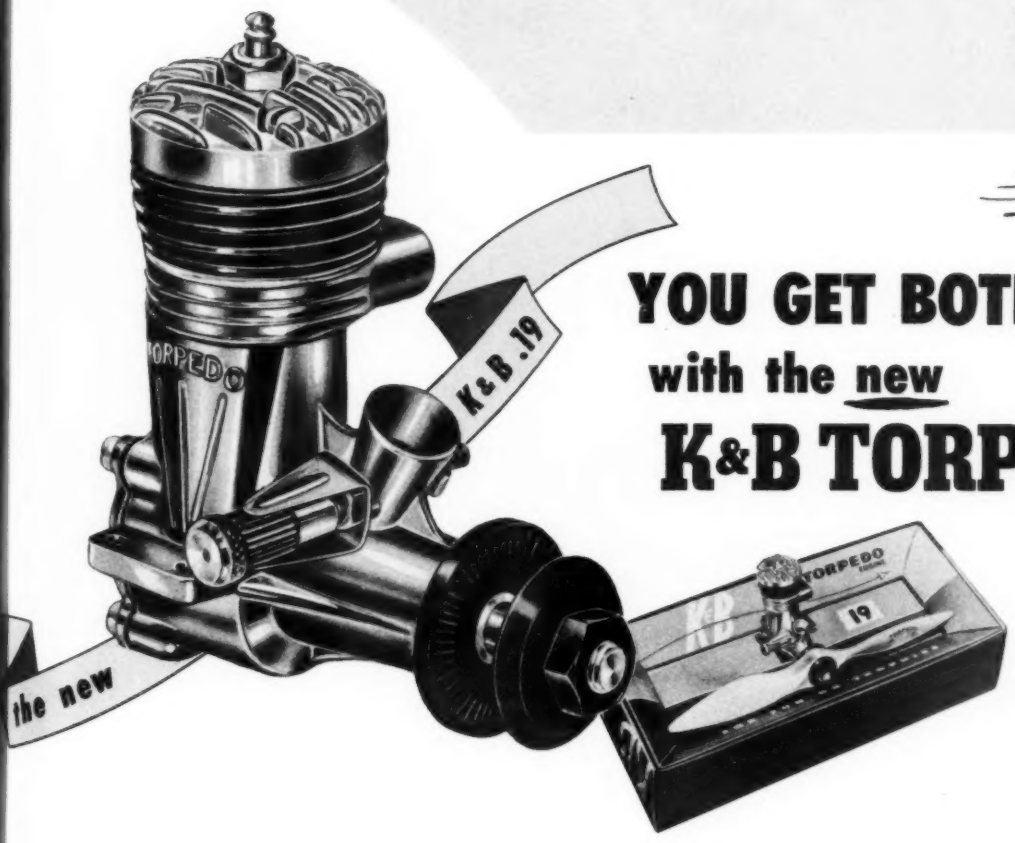

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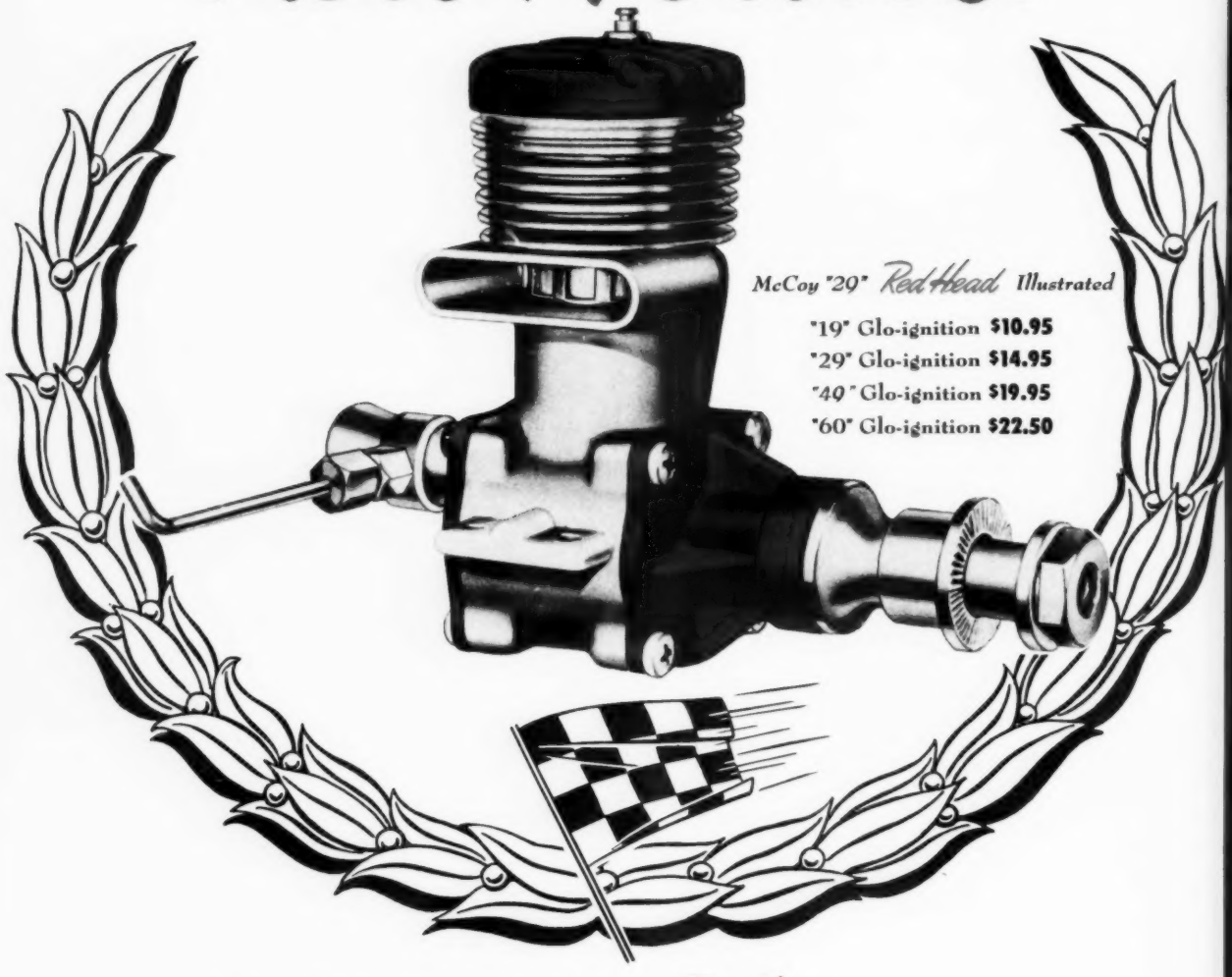

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